JUNE 1937
VOLUME 14
NUMBER 10

MODERN PLASTICS

E. F. LOUGEE, Editor
C. A. BRESKIN, Publisher
Dr. G. M. KLINE, Technical Editor

Of General Interest

Technical Section

News and Features

RAYMOND LOEWY

Next Month

Raymond Loewy, well known industrial designer, combines his living and working quarters in a comfortable penthouse atop a Fifth Avenue building and we shall illustrate the manner in which he has used laminated plastics in its interior design. The story of Moulage as used in making death masks and reproducing evidence of crime at the Federal Bureau of Investigation will appear in July. Federal approval came too late to include it in June

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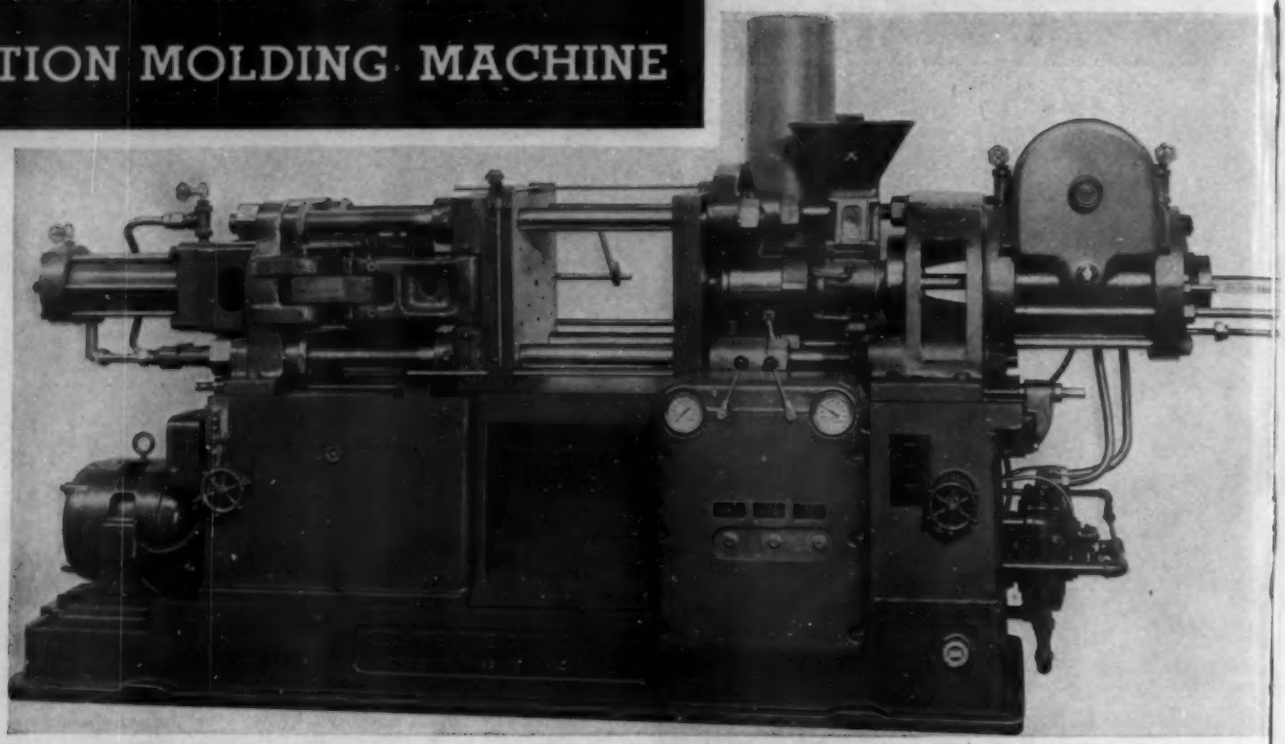
REED PRENTICE

New NO. 10

Automatic Full Hydraulic

INJECTION MOLDING MACHINE

ADVERTISING PAGES REMOVED



with NITROGEN BOTTLE ACCUMULATOR . . . . . .

---to increase speed of injection for some pieces requiring rapid flow with extra large charge or small and varied cross section with long flow. (Furnished extra charge.)

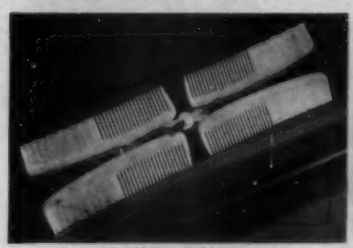
Other Construction Features

1. Molds are opened and closed and material is injected hydraulically.
2. Molds are rigidly locked by toggle mechanism.
3. Entire toggle end of machine is adjustable through screw mechanism.
4. Entire injection cylinder end of machine is adjustable through screw mechanism.
5. Machine when operated automatically is electrically controlled through three timing units adjustable from 1 to 120 seconds.
6. Machine can be operated automatically on single cycle, using two of the timing controls.
7. When the machine is manually operated, it is controlled by two levers, one for closing the mold, the other for operating the injection cylinder.
8. Machine is self-contained and base serves as oil reservoir.
9. Electric heating unit including rheostat for heating of material furnished and provision made for thermometer or thermocouple, furnished at extra charge.
10. Die plates can be supplied to accommodate customer's molds, and distance between die plates can be increased if desired to 24", at extra cost.
11. Safety device and automatic knock-out for product provided.
12. All die plates and toggle construction made from steel castings.

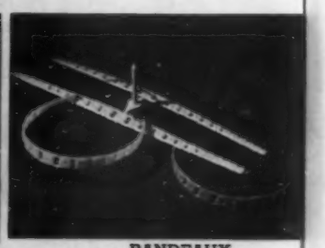
General Specifications

Capacity of Hopper Slide—7 c/in. Gran. Material, 2¾ c/in. moulded, 2 oz. moulded	
Estimated shots per hour—up to 400, varying with type of part, 500 c/in moulded material per hour, 24 lbs. per hour	
Pressure per sq. in. on material—2000 to 20,000 lbs.	
Maximum injection area of mould capacity—24 sq. in.	
Diameter of plunger—1¾"	
Stroke—7"	
Approximate power consumption for heating unit	0.5 to 1.5 KWH
Size of die plates	18" × 20"
Capacity of feed hopper	20 lbs.
Space between bars	12" × 12"
Die Opening	8"
Maximum die space	18"
Minimum die space	6½"
Diameter of tie bars	2½"
Oil pressure	1000 lbs. sq. in.
Motor recommended	5 HP 1200 RPM
Floor Space	144" × 40"
Weight, approximately, exclusive drive motor	9100 lbs.

Machine is heavily constructed throughout with highest grade materials and workmanship consistent with best machine tool practice and American production demands.



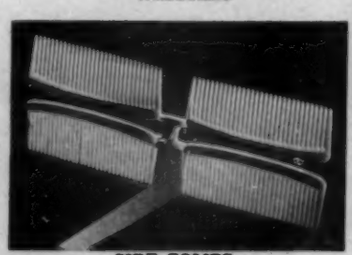
POCKET COMBS



BANDEAUX

WHISTLES

DRESSER COMBS



SIDE COMBS

DRESSER COMBS

TYPICAL PRODUCTION . . . on above parts 4-6 shots per minute.

AGENTS

NEFF KOHLBUSCH & BISSELL, INC.
2400 West Madison Street, Chicago, Ill.

L. H. MESKER
Hotel Hollenden, Cleveland, Ohio

STERLING-FRENCH MACHINERY CO.
New Center Bldg., Detroit, Mich.

TRIPLEX MACHINE TOOL CORP.
125 Barclay Street, New York, N. Y.

MACHINE TOOLS

REED-PRENTICE CORP.

WORCESTER MASS., U.S.A.

NEW YORK OFFICE - 125 BARCLAY STREET

MODERN PLASTICS

JUNE 1937
VOLUME 14
NUMBER 10

THREE SECONDS AND IT'S OUT!

by DON MASSON

Bakelite Corporation

Probably in no other place is dependability so definitely demanded as in fire-alarm and extinguisher equipment

OUT IN THE TOWN OF BLOOMFIELD, N. J., THERE is a company that specializes in making fires three or four times a year. These are no ordinary bon-fires, but fires of every sort staged with combustible liquids burning under the most severe conditions that are encountered when the unexpected happens on land and sea and in the air. The purpose of these periodic fire "parties" is to demonstrate the dependability and efficiency of the latest in fire extinguishing equipment—Lux carbon-dioxide fire extinguishers, made by Walter Kidde & Company.

1

Carbon-dioxide may be better known to you as the stuff that puts the sparkle in carbonated beverages. In its solid form it can be recognized as dry ice. When compressed in a cylinder under 850 pounds pressure, it is a liquid, but as soon as it is released by a turn of the valve handle, it assumes the form of a white fleecy cloud which blankets and smothers the fire. No fire can exist even for a second where 15 percent of the air is carbon-dioxide. Yet this gas is harmless to humans; non-poisonous; and non-corrosive: inert and a non-conductor of electricity.

When the valve of the extinguisher is opened, the carbon-dioxide is forced out so rapidly that expansion of the gas has a refrigerating effect—110 deg. F! The discharge looks like a cloud of steam. In reality it is dry carbonic "snow." When discharged into the interior of a room it leaves no mess or moisture and is removed merely by ventilating.

This, briefly, is the background of this new type of fire-fighting equipment which was demonstrated recently to several hundred spectators. At the "Spring Party" a small can of gasoline about $1\frac{1}{2}$ feet square was ignited

1. Extinguishing a gasoline test fire with a Lux extinguisher equipped with laminated plastic horn

2

3

2. Extinguishing test fire in a printing press with an extinguisher equipped with a laminated phenolic horn
3. Demonstration car fire being extinguished with a Model 2 Lux extinguisher which has a molded horn

as the first demonstration. It burned for 13 seconds and it took only 3 seconds after the fire was attacked with a small model extinguisher to put it out.

What is more dreaded than a running stream of liquid fire from the rear of a gasoline tank truck! To demonstrate the effectiveness of carbon-dioxide for extinguishing fire of this kind, a 10-quart pail, with bottom perforated, was placed in the rear compartment of a 500-gallon tank truck. Gasoline was poured into the pail so that a fire existed in the pail and, also, in a running stream on the ground covering an area of about 6 square feet. The fire burned 10 seconds and then was attacked with a No. 10 model extinguisher. It took 19 seconds to put the fire out. Another type of extinguisher was used on this same fire and was applied for 45 seconds without success. Next, spectators saw 6 wash tubs, 2 feet in diameter, filled respectively with gasoline, calcium carbide and water (acetylene), oil-soaked excelsior, a lacquer solvent, lacquer and alcohol. The tubs were then ignited and attacked with a carbon-dioxide portable extinguisher. All of the fires were extinguished with one unit in a total time of 18 seconds.

To simulate the dreaded bilge fire on a ship, a wooden framework was constructed. Within the framework was a pan $7\frac{1}{2}$ feet long and 2 feet wide, filled with gasoline and oil. The framework had previously been

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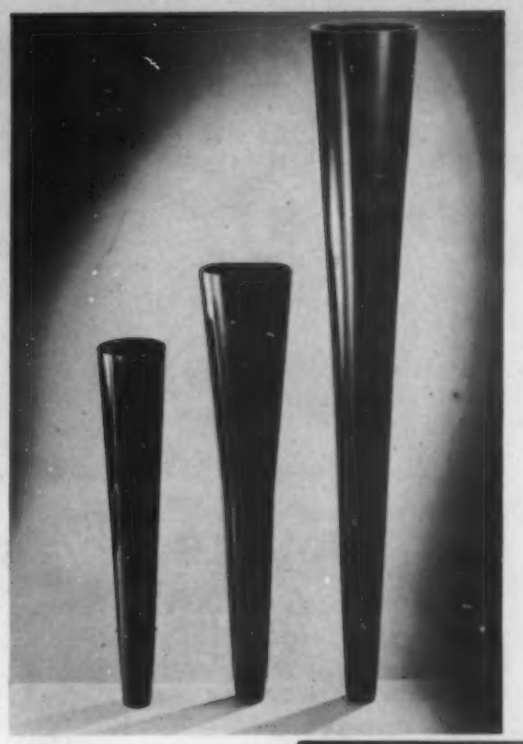

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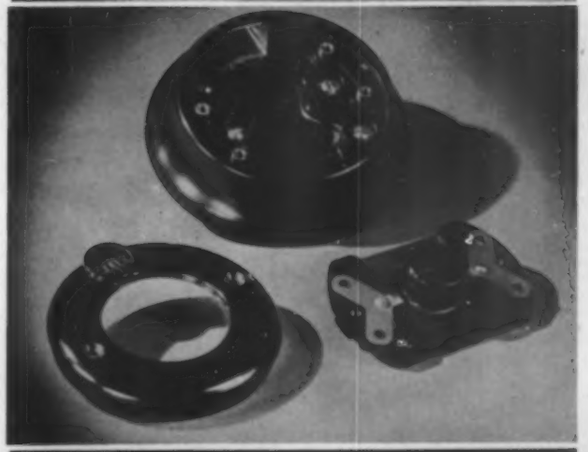
4. Molded extinguisher horn 8 in. high with improved impact resistant material having shock resistance as well as electrical resistance. 5. Laminated sprayer horns ranging in length from 17½ in. to 32 inches. 6. Heat detector with molded base which warns of excessive temperature at a certain degree, and is invisibly installed between walls or decks. 7. Fire alarm receptacle molded with inserts in three parts. Breaking the glass completes the circuit. 8. Molded heat detector which is attached flat to a wall or ceiling



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saturated with oil and gasoline. This was ignited, and after the fire had been burning for 1 minute and 28 seconds and was deeply seated in the wood framework, it was attacked and extinguished in 10 seconds.

An airplane pilot cannot watch his engines continuously. Engine fires, hidden by the nascelle and cowling, have been known to break out and grow to serious proportions before they were seen. To demonstrate how the slipstream on an airplane aids rather than hinders the effectiveness of the Lux system, a 5 cylinder radial airplane engine was equipped with cowling so as to represent the engine compartment of a plane. Gasoline from a 10 gallon tank was discharged over the engine block through perforated tubing. In front of the engine was a high velocity blower to give a condition comparable to an airplane afire in flight. After the fire had burned for about 21 seconds, it was extinguished in 2 seconds by the use of a built-in extinguishing system for airplanes. Other demonstrations included the harmless character of the carbon-dioxide gas on an electric motor while operating; the extinguishing in 3 seconds of a blazing fire in a motor boat engine room; and a dip tank and drain board fire representing the hazard in industrial plants where parts are dipped in (*Continued on page 73*)

THIS PLASTIC AGE OF COLOR

by HOWARD KETCHAM*

The right color is of tremendous value in a product today. Aside from the aspect of beauty, it imparts helpful emphasis particularly if it is unusual or unexpected. The true purpose of color in commerce is to put proper emphasis on the product to accentuate as much as possible the greatest beauty of line and surface texture

THE VALIDITY OF THE SPECIFIC RESPONSE which color evokes makes it an active and aggressive factor in the sale of merchandise ranging from fuel to motor cars. Unquestionably the most potent force in selling today is the subconscious influence exerted upon the prospect by the appearance of a product and at least 75 percent of that appeal can be safely ascribed to the discriminating choice and use of color. (Science points out that we give more attention to eye suggestion than we do to ear suggestion—that the nerves leading from the eye to the brain are much larger than those from the ear.)

The alert mechandiser, who adjusts his marketing program not only to established color preferences but to current trends as well, has a tremendous advantage over his rivals. For one thing, he uses only those colors which he knows in advance will appeal to his market, thus decreasing the size of his inventories. He knows which colors are generally preferred by women and which by men. He makes allowance for the fact that the consumer has come to consider certain colors appropriate for certain products—that he prefers weak chroma variations of yellow and orange for building materials; weak chroma variations of yellow and purple for perfume, brilliant reds and yellow for hard candies, and yellow and green for soap. By studying trends in the immediate past, and anticipating color styles, he manages to ride fad waves successfully. If he is an exporter of automobiles, he avoids sending green cars to England where the color is traditionally associated with bad luck. He knows that a certain dark blue attracts the greatest attention from women and exerts the greatest remembrance influence, and that purple of a certain hue, value and chroma acts similarly upon men.

This practical knowledge of color which the merchandiser uses to increase his sales is not based on conjecture. It is the result of comprehensive market analyses which are being made constantly. These analyses vary in method according to the merchandise under consideration, but in general they follow a definite form of attack.

It is decidedly important to get the *right* color for merchandise. Women are most interested in style, appearance and new ensemble ideas. Monotony or sameness in the color of things tends to discourage buying. It is just as important to know when to alter production colors,

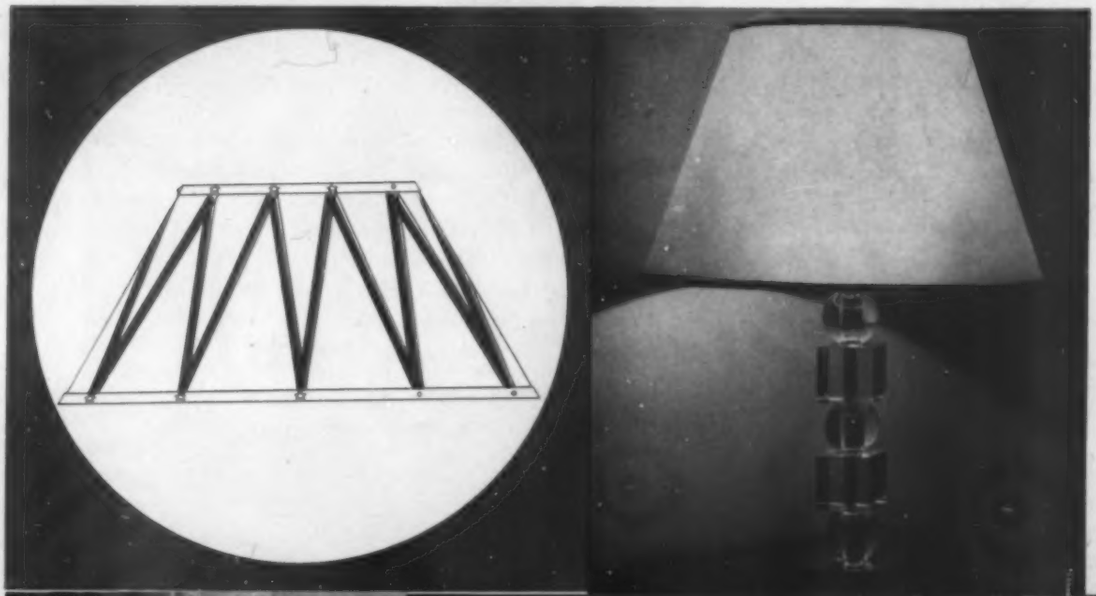
* Color Engineer and Consultant, Plastics Department, E. I. du Pont de Nemours & Co., Inc.

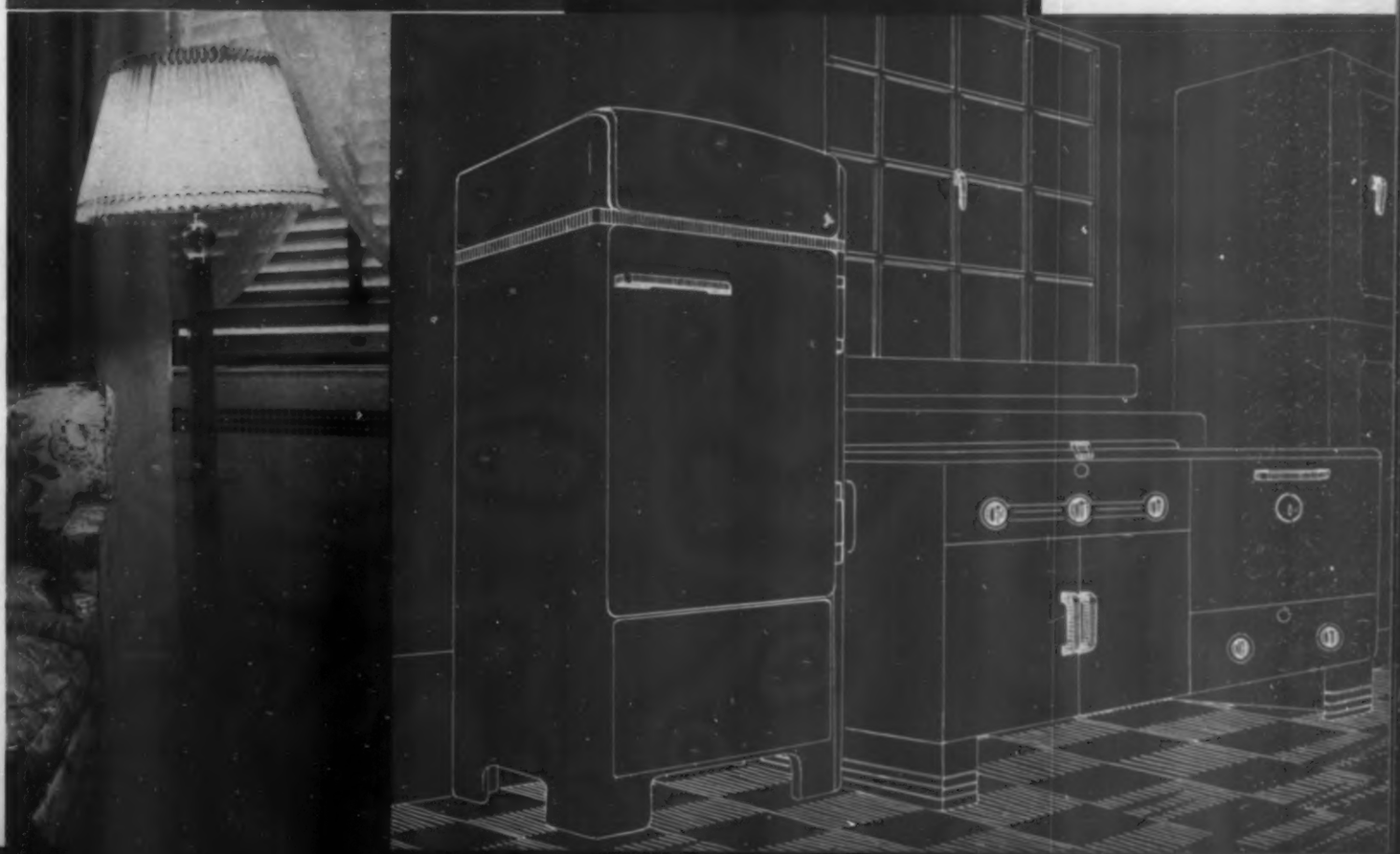
and there is only one *sure* way to know what colors to produce . . . by national surveys conducted among "key" women. Competent direction of these surveys enables the forecasting of preferred colors within a very close margin. It is these preferred colors that will have the best chance of selling merchandise.

The preferences and resistances that exist for colors vary in different parts of the country, due to geographical and economic conditions. Witness the marked predominance in the sale of black motor cars in large Eastern cities and the dearth of black colored cars in the Far West where tan is the most popular "buy" of the lighter shades.

Many automobile manufacturers have extended the range of standard production color variations and have replaced many metal interior fittings with plastics in recent years in order to appeal *(Continued on page 80)*

Delicate color schemes, particularly in mottled variations are made possible in toiletware by certain plastics in which handles can be clear or of color to match. Those on the opposite page are of Pyralin with Lucite handles. Lampshades of plastics have the dual advantage of permanent color and a surface which can be easily cleaned. When illuminated, the decorations merge with the background creating a delicate overall effect. By providing interchangeable color relationship between accent coloring on kitchen appliances (handles, moldings, name plates) linoleum and curtains, plastics are helping manufacturers to sell complete kitchen equipment instead of single units unrelated by color. (Photos, courtesy du Pont)





SOCIETY OF THE PLASTICS INDUSTRY

ON MAY 24–25 BUCKWOOD INN WITH ITS SPREADing lawns and rolling fairways nestled beside the river at Delaware Water Gap, Pennsylvania, welcomed for the third spring those molders and materials suppliers who have made a practice of gathering for a few rounds of golf two or three times each year. It was by far the most widely attended meeting and the most enjoyable, with nearly one hundred and twenty members of the industry assembled for two days of fun.

To those who have attended all three of these spring conclaves, the progress in friendliness and good fellowship which has developed throughout the industry must have been perfectly obvious. And expressions from some of those attending for the first time voiced real amazement. It was more like the gathering of the male members of an enormous family or like a class reunion from some remote college than it was like any assembly of executives from a competitive industry.

When the first such meeting was called in the spring of 1935, some forty men dubiously answered the summons but before two days had passed, many of them who had known each other only by reputation or in a casual way became fast friends. Regional meetings in Chicago, Ill., Lenox, Mass., and at Buckwood followed with the result that the spring meeting of 1936 was attended by about eighty men.

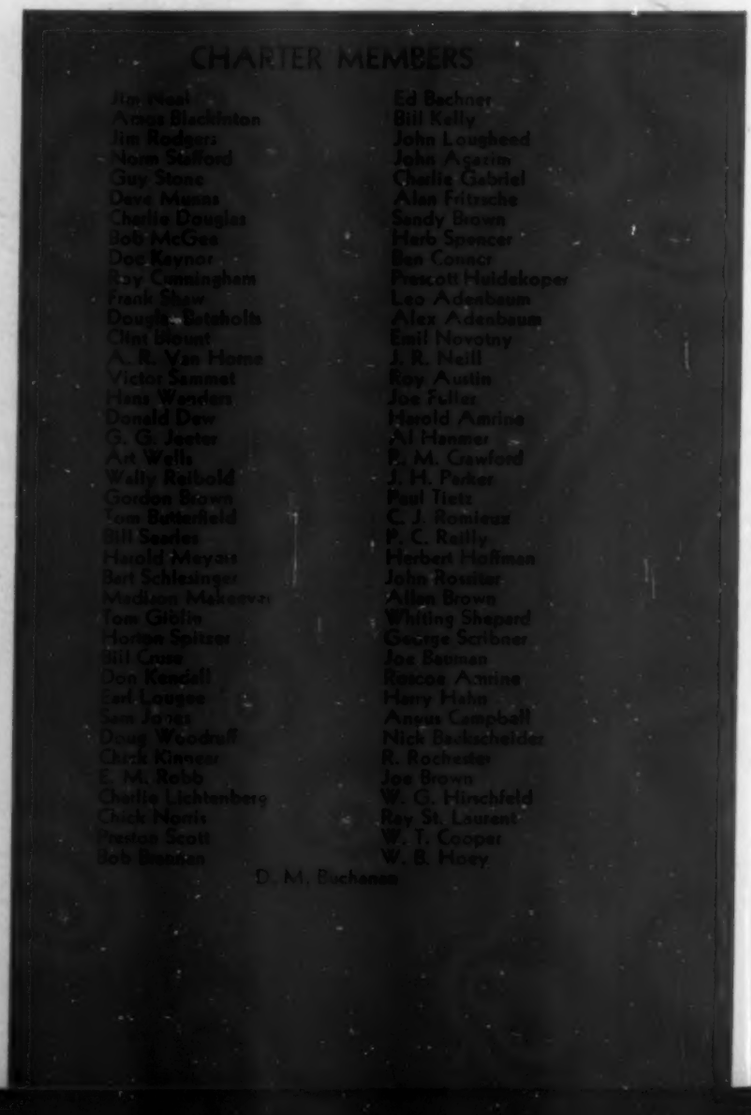
At a regional meeting held at the Berkshire Hunt and Country Club at Lenox, Mass., last fall, Gordon Brown, sales manager of the Bakelite Corporation who had called the original meeting and fostered those which followed, proposed that a permanent Society of the Plastics Industry be formed to take over the operation of these "get-togethers" and become financially responsible in its own right. In less than an hour, some forty-odd of those present signed the roster and paid their initiation fee of five dollars.

After this meeting, all molders and materials suppliers were invited by letter to become members and those who accepted previous to the current meeting at Buckwood were designated as Charter Members. Their names appear elsewhere on this page.

On Sunday evening, May 23, those of the Charter Members who were present at Buckwood held their first meeting, launched the Society and elected officers. Prescott Huidekoper, American Insulator Corp., New Freedom, Pa., was elected president; Ronald Kinnear, Niagara Insul-Bake Specialty Co. Inc., Albany, N. Y., is vice-president; and William L. Kelly, Chicago Molded Products Corp., Chicago, Ill., is secretary and treasurer. In addition, Victor Sammet, Northern Industrial Chemical Co., Boston, Mass., Alan Fritzsche, General Industries Co., Elyria, Ohio; and James L. Rodgers, Plaskon Co. Inc., Toledo, Ohio, were chosen directors.

The object of the Society is purely social. There are NO dues, and the only cost to members (besides the $5.00 initiation fee) is a contribution of two dollars per person from those attending meetings. This will be used for prizes to be awarded for golf and sports, and for the incidental costs of calling members together. All molders and those engaged in the manufacture of plastic materials are eligible to membership and it is expected that before the next regional meeting many more names will be added to the list. Many joined or expressed their intention of doing so before adjournment at Buckwood. Among these were A. F. Markus and D. M. Hanson of Detroit Molded Products Co.; Bevis Longstreth, Thiokol Corp.; Bob Grant, Tennessee Eastman Corp.; Ray St. Laurent, Bakelite-Rogers Corp.; W. T. Cooper, W. B. Hoey, D. M. Buchanan and J. M. Fenlin of the Bakelite Corp.; George Kuhn of Kuhn & Jacob; Henry Kasch of Kurz-Kasch Corp. and Charles A. Breskin and Alan Cole of MODERN PLASTICS magazine.

The Society was formally announced at a dinner held in the main dining room at Buckwood Inn, Monday evening, and the officers were introduced. An invitation is extended to the entire molding fraternity and to those engaged in the manufacture of molding materials to become members and enjoy the benefits of friendship and fun which are bound to ensue. Prizes were awarded for those proficient at golf.



We salute Gordon Brown, sales manager of the Bakelite Corporation, who in the past three years has accomplished more than any individual previously has been able to do in building good-will and friendship within the molding fraternity. It is through his personal efforts that the successful organization of the industry has been finally established in the "Society of the Plastics Industry"

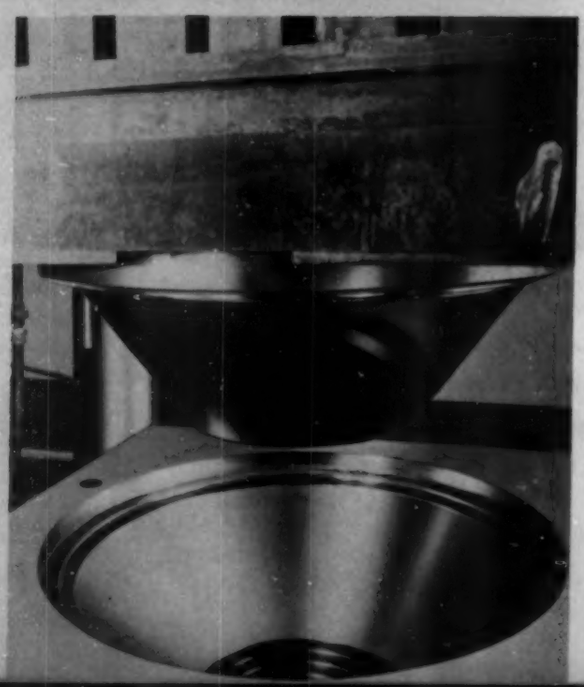
MOLD COST NO LONGER A BARRIER

The cost of getting an item into production is important but incidental. It should not be permitted to stand in the way of eventual savings of many times the amount

THE NEW PILOT ALL-WAVE RADIO, DESIGNED by Jan Streng, has one of the largest cabinets yet molded of plastics. Its dimensions are 18 1/4 in. high, 13 1/2 in. wide, and 10 3/8 in. deep; its weight, ten pounds.

The new Wakefield Reflector, "The Commodore Luminaire," designed by Harold Van Doren for the Wakefield Brass Co. has an area of 550 sq. in. with a diameter of 26 1/2 in. and a depth of 11 1/4 in. yet it weighs but five pounds, replacing a reflector five times its weight.

Large moldings are no longer news, but they indicate a trend too important to suppress. They demonstrate recognition that mold costs are an investment, not an expense. That they are no longer a barrier, whatever size. Three months ago we pictured the Teleprinter housing introduced at that time by Western Union. That, too, was a large molding and among the first to be employed in the manufacture of business machines. Others in this branch of industry will doubtless appear in due time. Toledo Scale was the first.



These new large cabinets and lighting reflectors illustrate this trend toward the use of molded plastics for applications not even considered practical a few years ago. Mold costs, which are frequently the basis of much discussion when a change to plastics is considered, are a matter of small importance when all phases of the advantages of plastics are taken into intelligent consideration. In the design of a new product, or the redesign of an old one, plastics either are, or are not, ideal materials to use. This can be quickly determined in a frank and open conference between manufacturing engineers and molding engineers. What the mold will cost is beside the point.

The Toledo Scale, for example, reduces its weight from 165 lbs. to 55 1/2 lbs. through redesign in which a plastic housing contributed to both the reduction in weight and improved appearance. The cost of the mold was more than saved through reduced shipping costs during the first six months. The reduction in freight and shipping costs effected for the year are reported to have been approximately eighteen thousand dollars. Surely a tidy item to save.

The Wakefield reflector, which weighs but 5 lbs. takes the place of a similar glass reflector which weighs 26 lbs. Its light weight allows it to be readily taken down for maintenance purposes with practically no possibility of breakage. Although the molds for this reflector were machined from some 8 1/2 tons of tool steel, requiring weeks of highly skilled and technical labor, The Commodore Luminaire actually sells below the cost of a similar metal and glass unit because of few rejections, small breakage and lower transportation costs.

Radios and plastics have a natural affinity. The internal insulation for which plastics serve is too well-known to discuss. But cabinets must withstand the exigencies of packing, shipping, handling in retail stores—being moved here and there for display, and still be perfectly presentable to enter into the harmonious

Top, left—T. E. Giblin, assistant manager of G. E. plastic sales, inspecting a 26 1/2 in. Wakefield reflector molded of Plaskon by General Electric. Below—cavity of the 5-ton mold on a 1,500-ton press

Above—New Pilot All-Wave Radio cabinet, designed by Jan Streng, and molded of Bakelite and Beetle by Associated Attleboro Mfgrs. Inc. At right—removing the molding all ready to assemble from a 500-ton press

surroundings they encounter in a well-decorated home. They must be able to resist the rapid changes in temperature caused alternately by steam heat and windows open for ventilation. They must remain unaffected in the extreme humidity of the tropics and serve equally well in the frosty atmosphere of a mountain lodge. When they have demonstrated their ability to do this year in and year out without complaints and returns, should the cost of a mold (whatever it may be) prevent the use of plastic materials in their manufacture?

The use of translucent urea plastics for lighting fixtures and shades has been a rapid development, the future of which no one can predict. Two reasons are perfectly obvious; safety and light weight. Beyond this, are a number of contributing factors which once recognized will further the development no end. In the first place, with a urea molding material, it is entirely possible to control wall thickness in such a manner that a perfectly equal distribution of light is obtained through the entire shade. Special ma- (*Continued on page 76*)

IS IMAGINATION NECESSARY?

(EDITORIAL COMMENT)

WHEN PLASTICS BEGAN TO CREEP OUT OF THE electrical field some ten years ago and demonstrate their advantages to other industries, many wild ideas were discussed and fantastic predictions were made. Industries, other than the electrical industry where plastics really made their first start, knew little about the materials or the technique of their making and handling. But new materials always whip the imaginations of manufacturers to a new frenzy in their search for lower costs and increased production. Everything from a molded coffin to a complete ten-room house was considered and discussed.

NEITHER MOLDED COFFINS NOR MOLDED houses have yet appeared but many of the early predictions have long since reached the state of reality. Limitations, which at first prevented the successful accomplishment of many of the things tried, have been lessened. New strength has been given to molding compositions. New materials have been concocted in the laboratory kettles which have proven their worth and are now in production. Technique has advanced to the extent where it is dangerous to say: "It can't be done."

One manufacturer will tell you he has reached the limit as far as the size of a plastic part is concerned. He declares he has molded the biggest part it is possible to produce. While in some other part of the country a molder is quietly planning and experimenting with a product which may be twice the size.

Henry Ford has been quoted as saying that he expects to see the day when automobile bodies will be molded of some plastic material, much lighter than metal. This may not be from any of the materials known today, yet again it may. Who, twenty years ago, would have imagined that gears stronger than steel would be made from bits of canvas soaked in resin and pressed into shape? Gears of this type are in everyday use in the timing systems of practically all automobiles. Larger gears of the same material are driving paper-making machines more than three hundred feet long, and proving their worth by outlasting other gears more than five to one.

INJECTION MOLDING, WHICH IS JUST BEING taken up seriously in this country, is probably in its infancy. It indicates an advanced method of manufacturing plastic parts in more rapid production. Its limitations at the present time confine it to thermoplastic materials and small parts. The currently popular injection molding press will take a charge of four to six ounces, but we are told there is at least one press in operation in this country which can accommodate an eighteen ounce charge and others here and abroad are on their way.

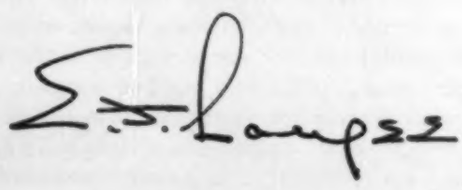
A logical query to this situation is: "How long will it be before a thermosetting plastic will be produced which is suited to injection molding?" "It will never come in our day," say some. "It won't be long," say others, who are aware of the insatiable research quietly going on in laboratories and experimental shops.

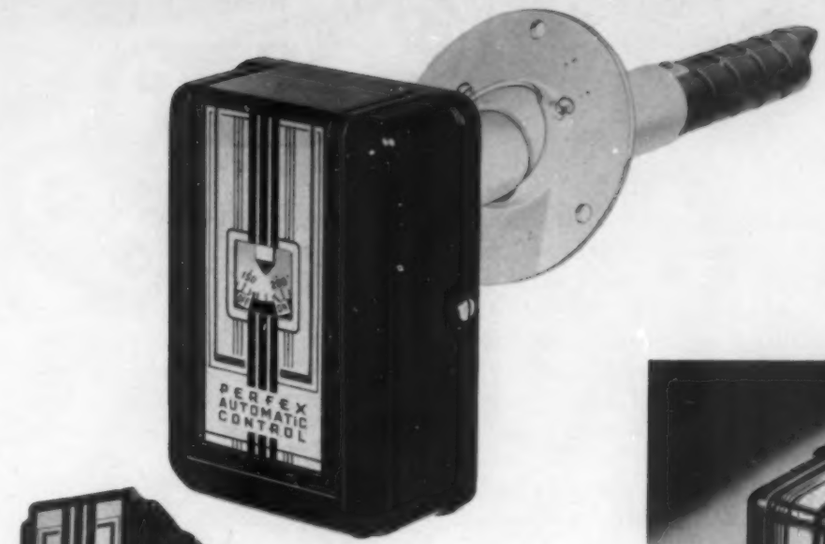
Extrusion is another logical step forward in the production of plastic parts. This is being done successfully in Europe and there is every reason to believe that within a comparatively short time moldings such as those used in building trim and for picture frames will be made in this country in this way.

ANOTHER THING WE HAVEN'T HEARD VERY much about is automatic molding presses but we shall soon. Presses will be built which will require only an up-ended drum of molding material to feed them and will need little or no attention until this drum is empty and must be replaced. Such presses have already been built and tried and the news that they have been perfected may pop out any day.

Trouble is, too many industrialists are satisfied to do things the same way they have always done them. They are not aware of the versatility of these new materials which are theirs for the effort to investigate and to employ. Builders and architects, too, are slow to appreciate the inevitable advantages they can offer their clients with these new decorative and fire resisting materials. Light weight, permanent finish, non-hydroscopic surfaces, are but a few of them. Too expensive! That is an excuse rather than a reason, because while some use that as a palliative, others are employing these materials to build better kitchens, baths, base-boards, doors, sills, mantels, and to fireproof ships and theaters as a monument to their wisdom and imagination.

LIMITATIONS? OF COURSE THERE ARE LIMITAtions. Plastics will never replace all other known materials. Nor are they even equal to them for many jobs. The point is: They provide industry with a new tool. A new opportunity for mass production. A new material of distinctive properties and long life. Imagination will quickly classify their pertinent uses. It will induce new and untried applications. And through such imagination, the industry will continue to grow.





Trio of molded controls designed by Ted Hess for domestic and industrial service. They are resistant to moisture, steam, oils, gases, heat and withstand rough usage

DUREZ

DESIGNING HEATING CONTROLS

by WALTER E. SCHUTZ
Perfex Controls Company

Free from the handicaps of tradition, a young company and an experienced designer employ these new plastic materials to their greatest advantage for instrument cases

THREE YEARS AGO WHEN THE PERFEX CONtrols Company was formed to make controls for the oil burner, stoker and air-conditioning field, its first problem was Design. We don't mean design in the mechanical sense, for our engineering story was already based on the idea of extreme simplicity and a principle of Double Contact. We mean Appearance Design.

Heat controls in those days were often mechanically good but their external appearance was utilitarian at best. Usually their cases were the result of trying to cover the "works" in the cheapest, easiest way, which meant a light stamping usually copied from a Gothic clock that someone had seen on his mantel. Or in the case of boiler controls, they were often simple box-like arrangements. They neither fitted into the newer trend of interior design nor added anything to the appearance of modern heating plants, which were already observing the trend toward smooth, smart contours.

One of our first decisions was *not* to imitate any of the controls then on the market, but to make a fresh start along modern lines, so that no oil burner or stoker manufacturer would be ashamed to use a Perfex Control with his most deluxe model. Our second decision was to use phenolic plastics, to get a precision piece that would seal the unit against dust, would remain shiny despite wear, guarantee users against shocks (*Continued on page 75*)

SEASHORE SUAVITIES

by EVE MAIN

WITH CHARACTERISTIC APLOMB AND VERVE, PLASTICS "GO DOWN TO THE SEA" in their summer role of gay adornment. In tune with this environment of sea, sun and irresponsibility, they shrewdly take shape from things of the air, land and ocean. A few choice examples fashioned from cast resin and shown below include a swallow caught in full flight; huge bee so lifelike that it wouldn't be surprising to hear it buzz at any moment; Schiaparelli type butterflies of clear plastic with natural colors hand painted on the under side; shell tortoise with head and legs extended as if it really were going places; long slender bug with gossamer wings; jeweled starfish; docile sea horse; graceful ladyfish; belligerent sail and swordfishes—all set for a rollicking summer at the shore. A dapper sea horse clings to the side of the aqua and white bathing suit pictured at the left, and blue plastic buttons march down the front in the center of a white panel. This suit, designed and modeled by Miss Elise Kornbrath, received Honorable Mention in the design contest sponsored this year by the Traphagen School of Fashion.

THE FIRST WARM SPELL ALONG THE NORTH Atlantic seaboard brings forth a crop of beach enthusiasts with a new game played with two, three-pound cast resin dice and regulation duck pins. This hybrid bowling game has been named "luck pins" and the score is tallied by the number of pins down and the number thrown on the dice. A miss penalizes the player the number thrown. Bathing suits are logical attire for this active sport and those shown above are garnished with pure white cast resin snails and colorful fish. (Pins, Wagner & Adler—Dice, Hurst, Inc.) Top: Three logsitters and baskers in the sun welcome the chance to don new beach outfits and small wonder. Left: Two-piece slack suit of navy Congo cloth and cocoanut husk beach hat provide admirable background for white cast resin frogs. Center: Three-piece suit of white Playtime cloth with navy shirt and high waisted slacks has a Bolero jacket closed with red prystal swordfish clips. Right: Three-piece suit of grey Congo cloth with high waisted slacks and new jeep jacket has a wine colored halter which matches the plastic buttons. A white, hand carved cast resin turtle crouches at the neck. Photographs, courtesy Catalin Corp. Beach outfits from James McCreery and Company.

PLASKON

MOLDED COLOR

The sharp upswing in the volume of Plaskon used for lighting equipment is evidence of the fact that the lighting industry is paying as much attention to eyesight conservation as to beauty; and that the industry is obtaining unsurpassed lighting results with molded Plaskon especially made for light shades.

The fast selling lighting fixture shown below is made by the John C. Virden Company of Cleveland. The Plaskon shades are shatter-proof and light in weight, and safer. They are kept clean more easily. They made possible a large saving in shipping and packing costs to the manufacturers. Molded by Chicago Molded Products.

LIGHT FIXTURE:

COSMETIC JARS:

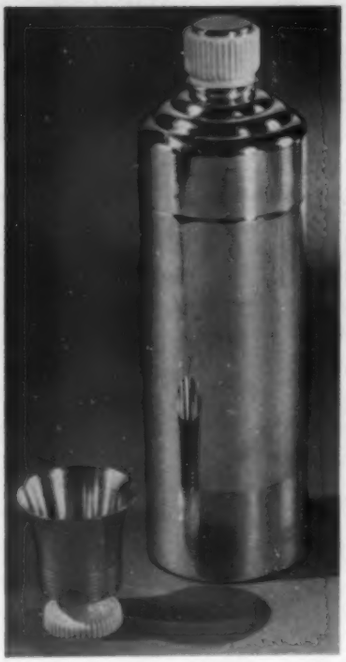
If you are thinking of changing the package you are using, but are worrying about what a new design will cost you, consider the case of Thomas Products, Inc., of Buffalo, makers of Brit-tex, the cream for brittle nails.

Thomas recently gave up the dark-topped, opal glass jar they had been using for several years, for a molded Plaskon container. Changing the design of their package didn't cost Thomas anything, however, because they selected a stock container of Colt's Patent Firearms Mfg. Company—the featherweight air-insulated Colt jar. Also adopted was a new ½-oz. container, which looks much larger than the old ½-oz. opal glass jar, and keeps Brit-tex in perfect condition.

There are hundreds of stock molded Plaskon containers. All can be labelled to give the package all the earmarks of a custom-made container. Why not write today for complete information?

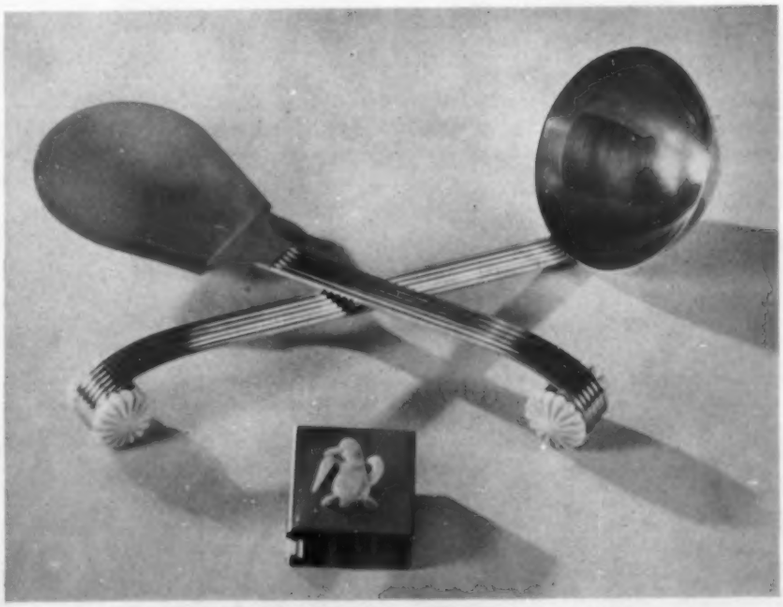
JUNE 1937

CHROMIUM WARE BY CHASE:



This lovely serviceware, made and designed by the Chase Brass & Copper Company, presents one of the most completely satisfying combinations thus far of chromium plate and plastics . . . and illustrates one of the most popular uses of Plaskon.

Molded Color handles, tops, pulls, and decorative insignia are beautiful and pleasant to touch. They are unharmed by soap and cleansing powders. Unlike handles of finished wood which they are largely replacing, they will never dent, chip, or peel. A wipe of a damp cloth is all that is ever needed to make them new again.



The Chase Molded Color parts are made in a single molding operation, complete with grooves, imbedded inserts, and final lustrous finish. The Waterbury Button Co., of Waterbury, and Plastic Molding Co., of Sandy Hook, Conn., are the molders.

Get in touch with Plaskon if you use handles, knobs, etc. Your inquiry will be answered promptly.

PLASKON COMPANY
INCORPORATED
2121 SYLVAN AVENUE, TOLEDO, OHIO
CANADIAN AGENTS: CANADIAN INDUSTRIES LIMITED, MONTREAL, P.Q.

1. Johnson Motor Company, makers of outboard motors which are used in all sorts of weather, salt water and fresh, require many non-corrosive parts. Distributor, coil tube and choke knob are molded of Durez by Eclipse Molded Products Co. and prevent shorting and carbon tracking from moisture conditions

2. This Bates razor and blade sharpener both have handles of white Beetle molded by the Richardson Company. The shaving set fits snugly in an enamel case ornamented with the plastic and incorporates a micrometer adjustable handle and sharpener which automatically hones and strops the blade in one operation

3. Elmo uses Plaskon, molded by the Closure Division of the Armstrong Cork Products, for its rouge or lipstick containers. They are colorful, light weight and will not chip in contact with other accessories carried in a handbag

4. Ring boxes styled by Wolfsheim & Sachs Inc. in which various appropriate colors of plastics are used to display and present smart jewelry. Molded of Plaskon and Bakelite by Boonton Molding Co. these boxes have spring hinges which allow them to open easily and snap tightly closed

5. Currently popular game of wits is Checker Peg, all molded of Durez in one piece. Its surface resists continual abrasion and scratching. Since the finish is not applied, constant wear cannot expose any base material. Molded by B. F. O'Shei, Inc.

6. A high temperature thermometer which is used in submarines to determine heat of water tanks, cooling water and bearings. It has a case molded by the General Electric Company for Moeller Instrument Company

7. Displays made of plastics are entirely appropriate for cosmetics, especially cosmetic jars such as these which are molded of Plaskon for the Dedon Laboratories by Colt's Patent Fire Arms Company. The display of contrasting colors of Catalin is manufactured by Royson Plasticraft Company

8. This tubular Lumiline bulb with aluminum reflector and molded Durez end caps in different colors is now designed as a stock lighting fixture for stores and public buildings Developed by Dean Holden the fixture blends with any interior color scheme

9. Bottles exhibited on this Bakelite display, molded by Northern Industrial Chemical Company for Ben Burk Inc., are entirely safe from customers who might like to sample. By means of set screws, the bottles are held securely in place

10. Gladys Glad has become a producer of the cosmetics which she believes will enhance feminine allure. Foundation and cold cream jars have Plaskon closures which are easy to open and close though the fingers are wet. The package design is both appropriate and simple

11. This blue-white transparent head lends an exotic charm to the millinery it displays in exclusive shops. Cast from solid Catalin, it catches all highlights and is heavy enough to stand rigidly on counters as well as in display windows without tipping over. Made by Lloyd Display & Equipment Co.

12. No excuse now for poor photographs from any camera. This Weston Photronic Exposure Meter indicates the exact length of exposure required under any combinations of light conditions. Its case of Bakelite gives lifetime service. Designed and molded by Weston Electrical Instrument Corp.

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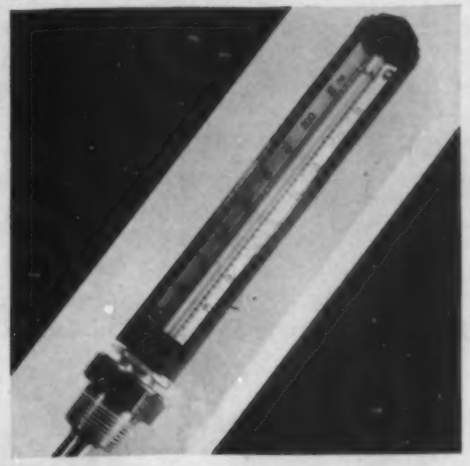

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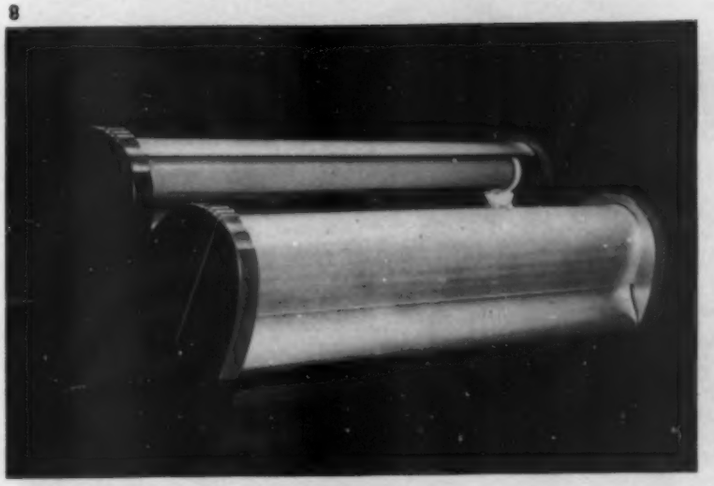

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PRINTING ON PLASTICS

by JEAN MAYER

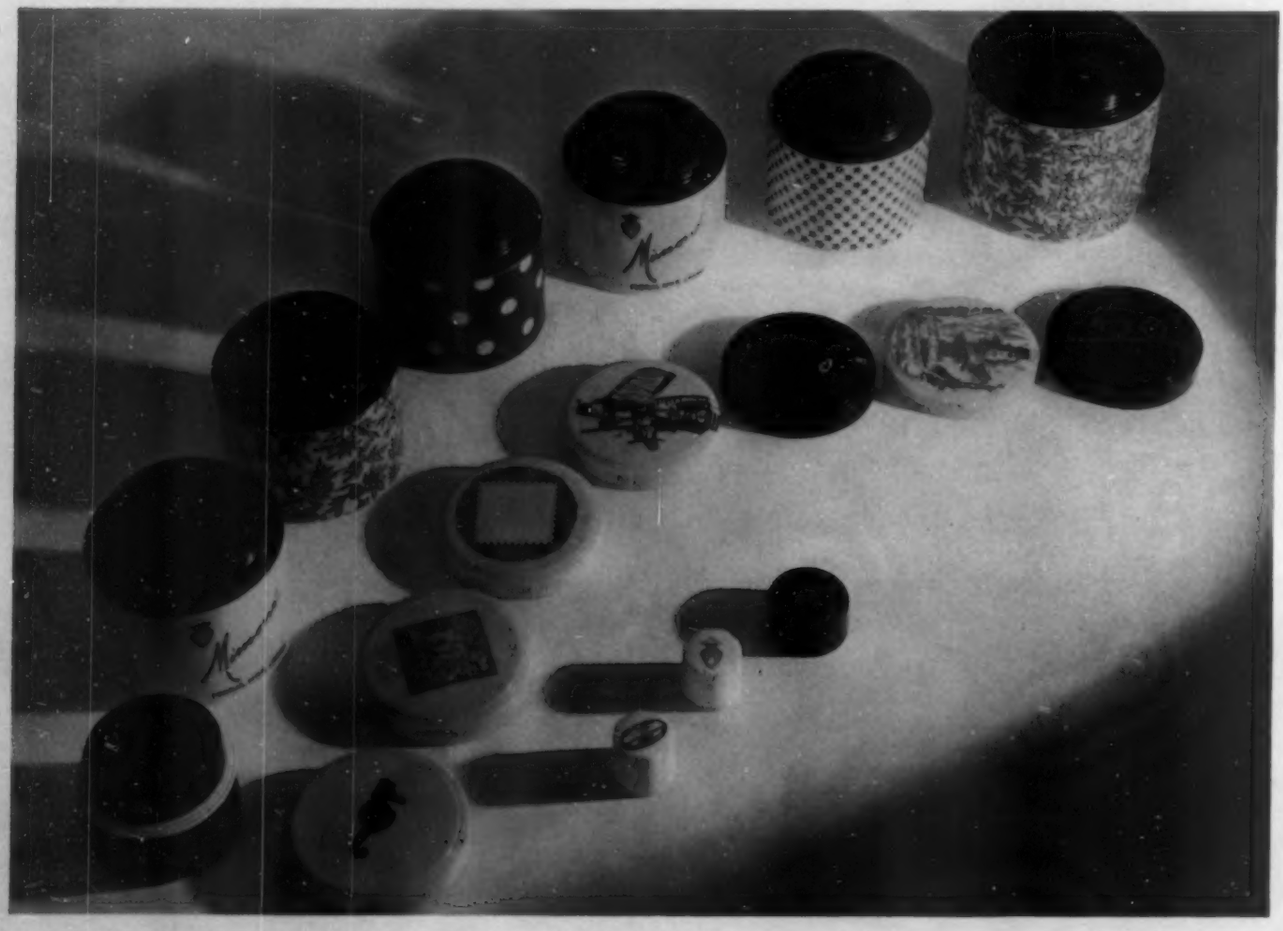
Jars from the same mold, if decorated with individual designs, need not look alike

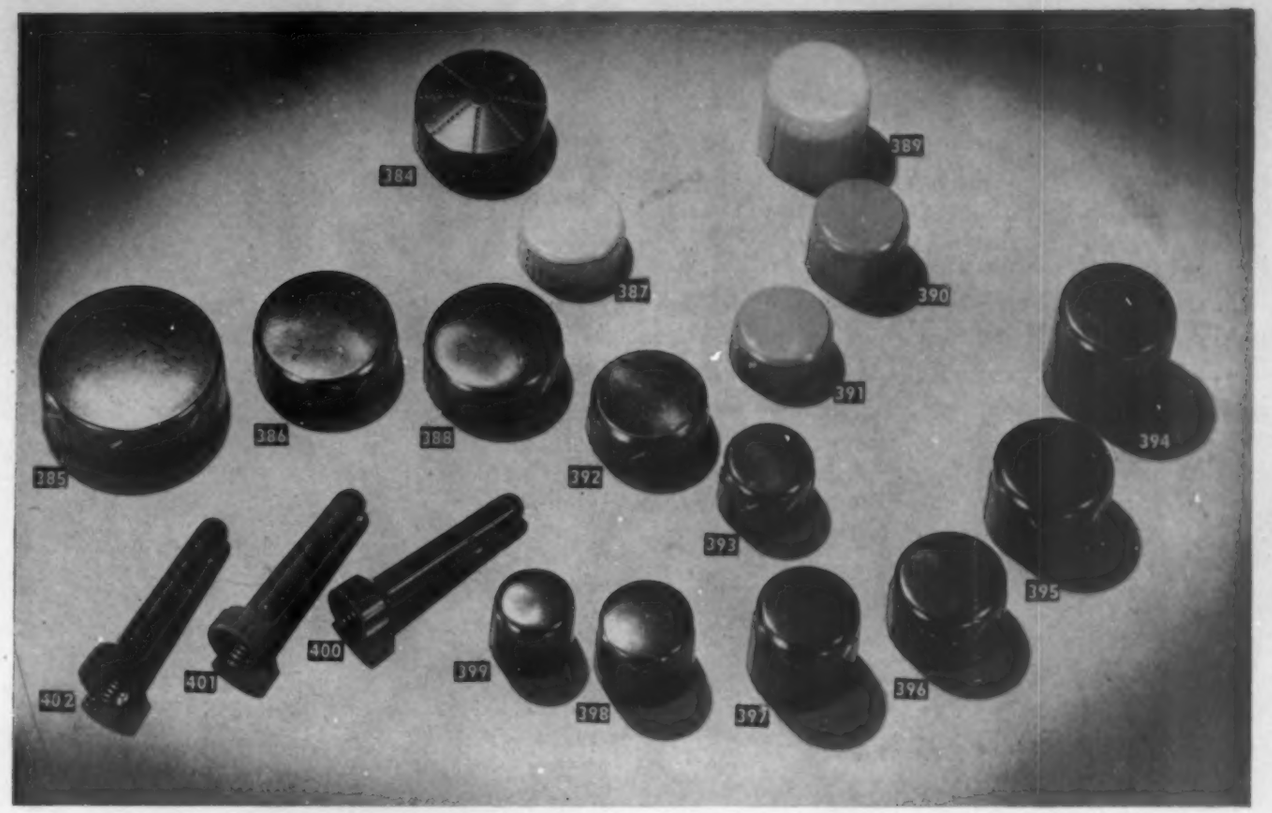
PRINTING ON PLASTICS IS NOT EXACTLY NEW. It has been tried with varying degrees of success for a number of years, but the demand created by the desire of manufacturers to package their product in these materials has been productive in recent months of more satisfactory results to all industry.

Until recently there has been considerable difficulty in printing on the surface of these synthetic materials with any assurance that the copy would stay on, yet manufacturers using them for packaging, found it necessary to print their trade name and advertising message directly on the container since labels could not always be made to stick satisfactorily on the smooth surfaces.

Manufacturers using stock molds, to eliminate the expense incurred by building a private mold, require some means by which a clean, sharp, colorful printed trade mark or identifying decoration can be used. In the February issue of MODERN PLASTICS, the process of roll leaf stamping was described. This is a method which by the use of heat and pressure, molded plastics can be branded with type or specially drawn designs.

Now comes another method called The Anigraphic Process by which it is possible for the first time to print on plastics in four colors in one operation. Half tones and line drawings may be accurately reproduced. The articles to be printed are automatically fed from a hopper. When the printing process is completed, automatic traveling conveyors conduct the containers through an electrically controlled oven where, for thirty minutes, they are subjected to (*Continued on page 76*)





Stock molds

SHEET THIRTY-FIVE

Closures with any specified liner are available from stock molds in a wide variety of colors. Write for samples on company letterhead specifying sheet and item number

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384. Threaded closure with cork and tin liner and debossed design. Diameter inside 1 1/8 in., 1/2 in. high

385. Threaded closure, cork and panaseal liner; 1 1/2 in. inside diameter, 9/16 in. high

386. 1 1/8 in. inside diameter, 1/2 in. high with cork liner

387. 7/8 in. inside diameter, 7/16 in. high with pulp and black oil liner

388. 1 1/16 in. inside diameter, 1/2 in. high. Pulp and yellow oil liner

389. 7/16 in. inside diameter, 15/16 in. high

390. 3/4 in. inside diameter, 7/16 in. high

391. 1/2 in. inside diameter, 1/2 in. high. Red rubber liner

393. 5/8 in. inside diameter, 3/8 in. high

394. 1 in. inside diameter, 1 in. high

395. 15/16 in. inside diameter, 3/4 in. high

396. 7/8 in. inside diameter, 5/8 in. high

397. 3/4 in. inside diameter, 7/8 in. high

398. 11/16 in. inside diameter, 11/16 in. high

399. 5/8 in. inside diameter, 5/8 in. high

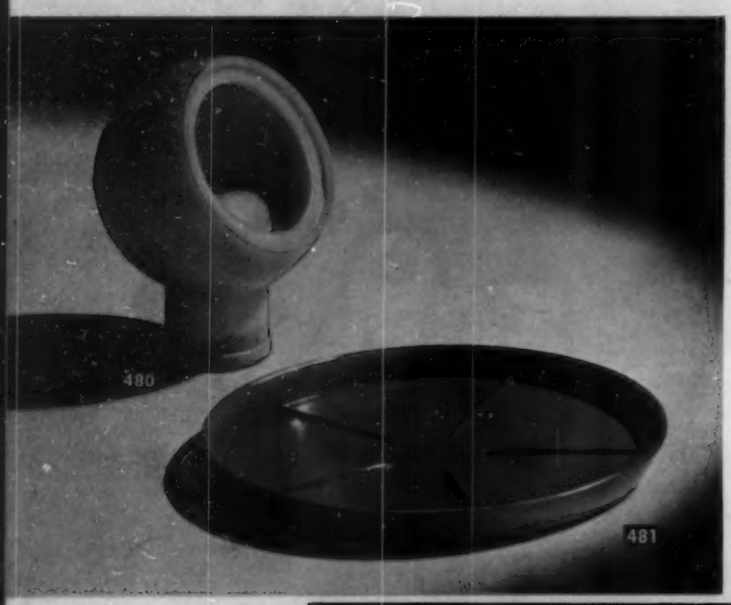
400, 401, 402. Rectal syringe tubes with ribbed and threaded bases. Diameter at base 3/8 in.

Address all inquiries to Stock Mold Department, Modern Plastics, 425 Fourth Avenue, N. Y. C. All molders are invited to send samples from stock molds to appear on this page as space permits.

Stock molds

SHEET THIRTY-SIX

Plastic parts which are excellent premium items are particularly practical when available from stock eliminating mold costs. Many different colors are obtainable and manufacturers may secure samples by writing on company letterhead and mentioning both sheet and item number



480. Beer tap handle with opening for name plate which is cemented on and identifies the brand. Threaded opening at base is 3/8 in. in diameter

481. Coasters 3 1/4 in. in diameter are available in different colors to distinguish individual drinks

449. Measuring spoons on one ring are made in four different colors and in four different sizes—they are equal in measurement to a tablespoon, teaspoon, 1/2 teaspoon and 1/4 teaspoon, respectively, and this identification is molded in each handle

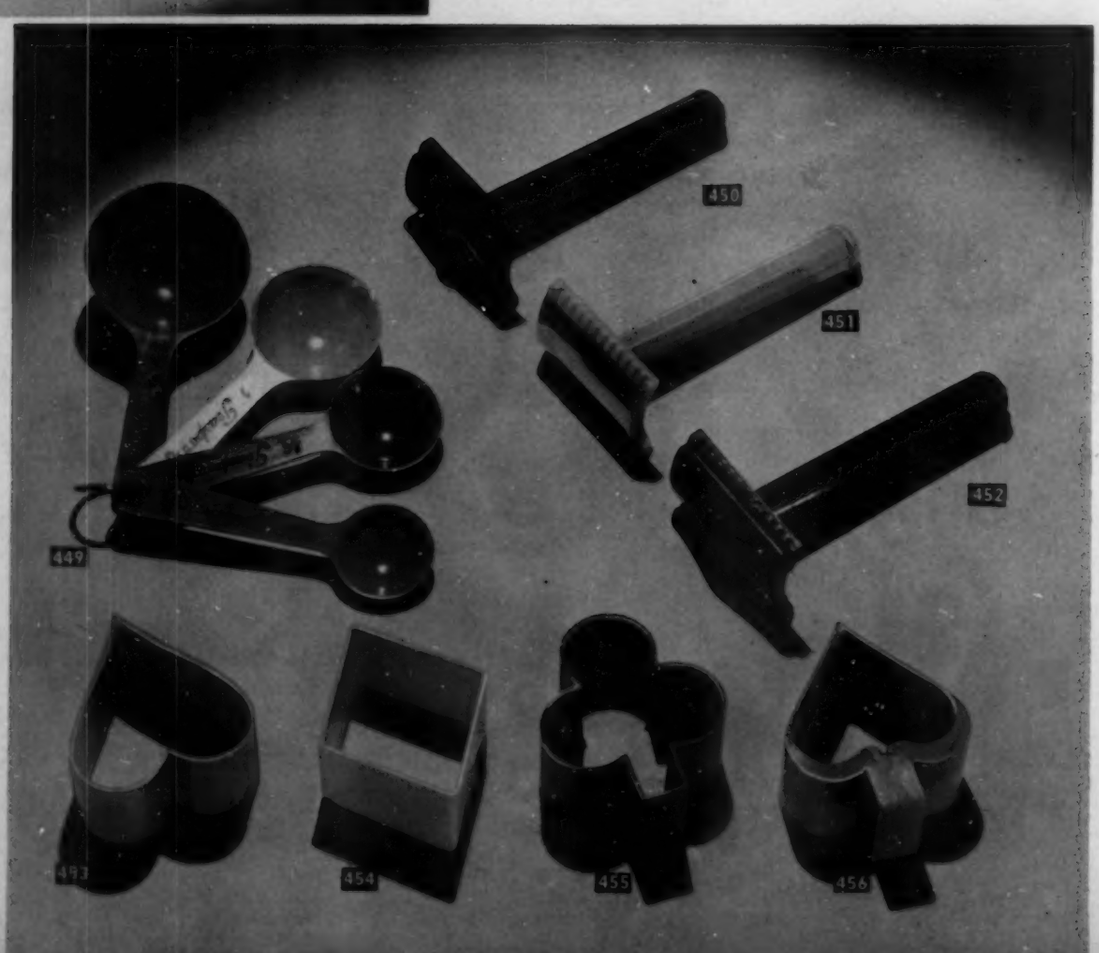
450. Razor molded in three separate parts. Handle with metal threads is 3 in. long. Top is slightly decorated

451. Same as 450 but with metal head

452. Same as 450 without decoration

453, 454, 455, 456. Cookie or canapé cutters for afternoon tea refreshments, or after an evening of bridge. The four molds are in different colors, light weight and easy to keep clean

Address all inquiries to Stock Mold Department, Modern Plastics, 425 Fourth Avenue, N. Y. C. All molders are invited to send samples from stock molds to appear on this page as space permits.



MODERN PLASTICS

TECHNICAL SECTION

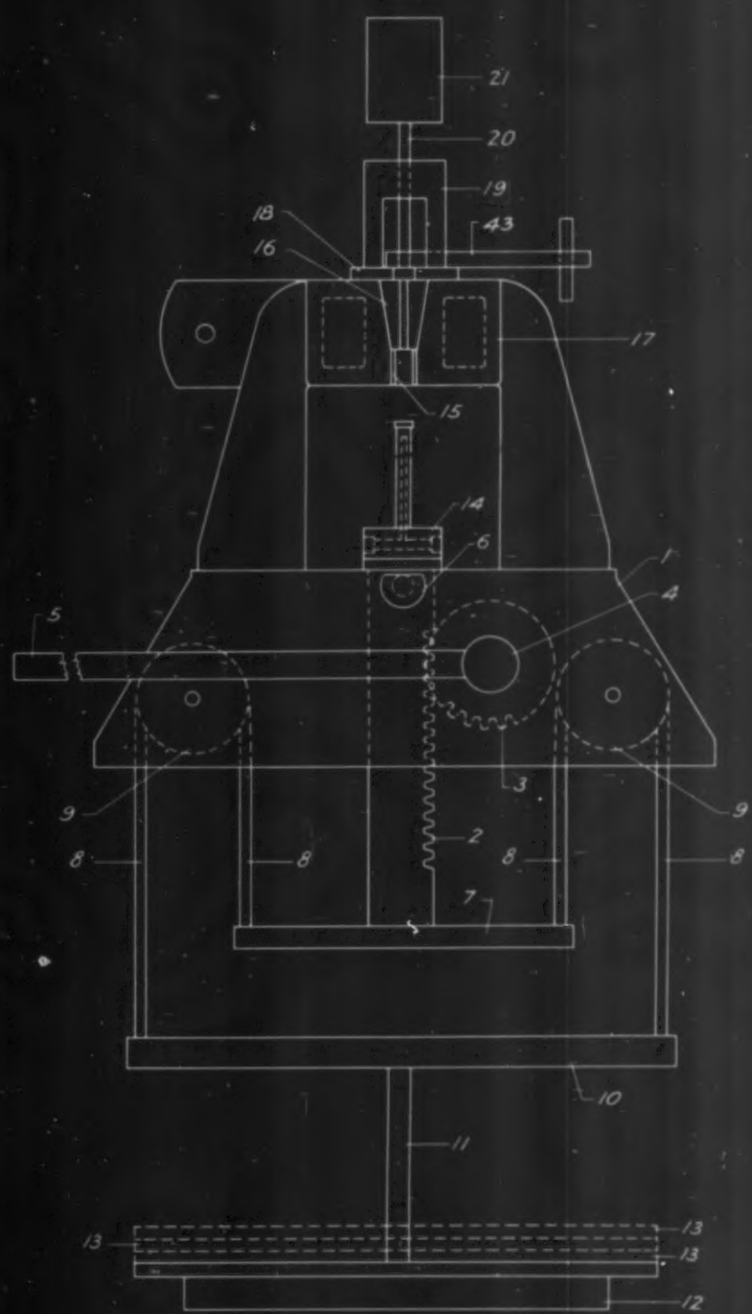


FIG. 18

"VERSATILITY"

A few of the many parts molded of Durite by The General Industries Co., Elyria, Ohio

USERS of Durite praise its extreme versatility. They find it can be used today for parts where electrical insulation is the prime problem — tomorrow when the problem may be strength, acid or heat resistance or when its striking finish may be used to give a product added sales appeal. These are but a few of the many qualities which make Durite versatile.

This is one of the reasons Durite has been the specified choice of leading companies for many years. If you have never learned of their advantages, write and ask about these unusual plastics by Durite, the exclusive producers of phenol-furfural resins.

DURITE *Plastics*

TRADE MARK REG.

Frankford Station P. O., Philadelphia, Pa.

A DIVISION OF STOKES & SMITH COMPANY

Molded of Durite by The General Industries Co.

MEASURING THE PLASTICITY OF HOT MOLDING COMPOUNDS

by GILBERT L. PEAKES
Bakelite Corporation

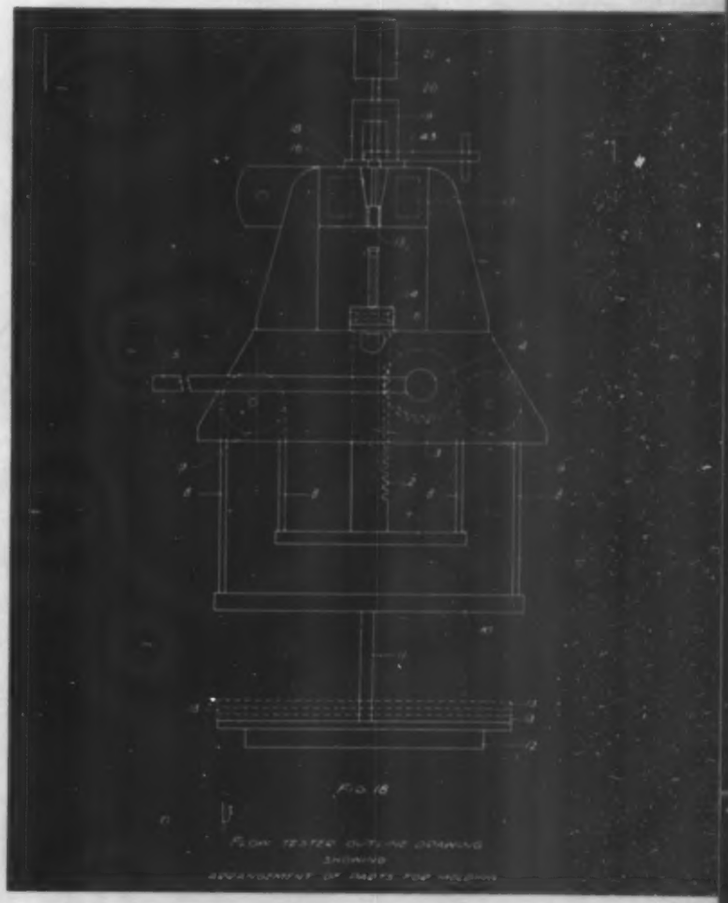
IV. The preheat test

IN THE PREVIOUS ARTICLES OF THE SERIES which have appeared in Plastics Products (February, March and April 1934) there were described certain types of tests on the flow tester. The present article discusses another important type of test, fundamental to the properties of thermosetting resins but believed to be hitherto generally unknown to the industry which uses these resins, although disclosed in the Rossi and Peakes U. S. patent 2,066,016, December 29, 1936. The test is called the preheat test and gives a means of measuring the time of the setting reaction, that is, the time required for the resin in the compound to progress from the well-known "A" to the final "C" stage. This measurement of reaction time is accomplished by a method which makes the results independent of the softness or plasticity of the compound.

There is one important difference between the new type of measurements on plastic properties as carried out in the flow tester and measurements made using other types of test equipment or commercial molds. No provision, except stalling the press, is made in the usual testing for temporarily stopping the flow so that observations of the result of heating on plasticity may be made. Commercial molding operations never provide for holding pressure on the material in a certain restricted part of the mold, later releasing it to flow to other parts of the mold. The heating of the compound in a commercial mold, or in any type of test mold except the flow tester, always takes place while the compound is flowing under pressure, or else while the press is stalled, the pressure at any moment before closure being no greater than the yield pressure of the material at the moment. As between different compounds in the same commercial mold, the rate of heating then always is directly influenced by the softness, which affects the flow and therefore the thickness and amount of surface at any moment, of the mass which is receiving heat. In order to put all classes of material on the same basis in regard to receiving their heat, the flow tester has provided the new feature of heating *at the same amount of flow*, namely, zero flow, while the material is completely confined and under pressure. This is the condition which obtains at the start of the new preheat test for determining setting time, where tablet and mold size are so arranged that the tablet is not broken or crushed and is not deformed more than a few thousandths of an inch during the heating period. This means, therefore, that determinations of setting time so made do not and cannot duplicate conditions under which setting time is manifested in commercial molding, This method for obtaining setting time has the very valuable feature of providing a measurement of the reaction under such conditions that all materials are on a comparable basis where the effect of flow has been eliminated.

The mechanism added to the flow tester to accomplish the measurement of setting time by a preheat test is shown in Fig. 18. Part 43 is known as a preheat slide it is essentially a two-tined fork which fits a horizontal groove provided inside yoke 19. When in place in the yoke it blocks the upward motion of follower rod 20 at its shoulder which lies within strap 18. To make a test, the machine is brought to the desired temperature, the weights are adjusted to the desired molding pressure and the preheat slide put in place. The pressure chosen will ordinarily be sufficient to force the material the full 1.50 inches of the flow tube, provided no hardening by heat occurs in advance of releasing. For most tests, 1040 lbs. per sq. in. is a satisfactory pressure.

Upon inserting the tablet of test material and applying pressure to it, the tablet is consolidated and reacted in a



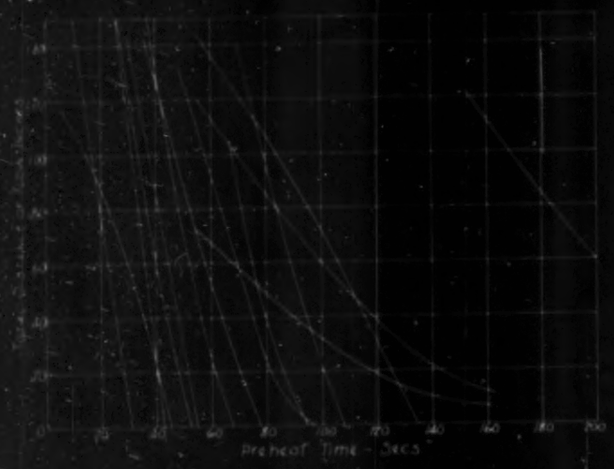


Fig. 19

SHOWING PREHEAT CURVES ON VARIOUS SAMPLES ALL AT 150°C AND 1040 Lbs PER SQ IN

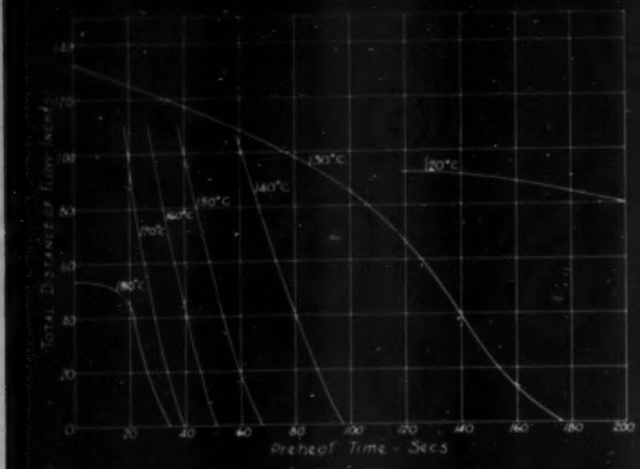


Fig. 20

EFFECT OF TEMPERATURE ON PREHEAT CURVE SAMPLE D.

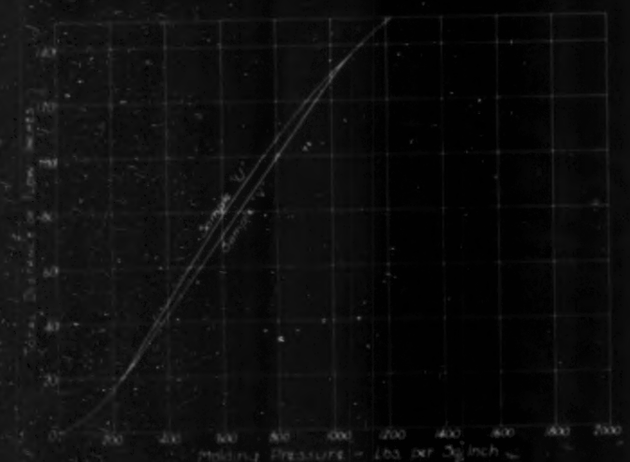


Fig. 21

DISTANCE PRESSURE CURVES SAMPLES U & V

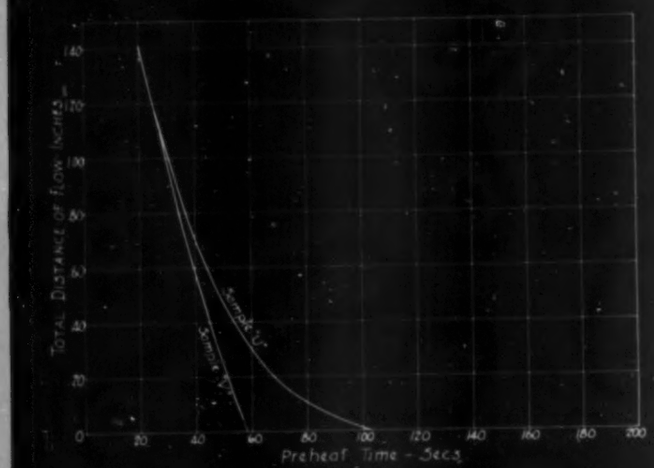


Fig. 22

PREHEAT CURVES - SAMPLES U & V

Fig. 23

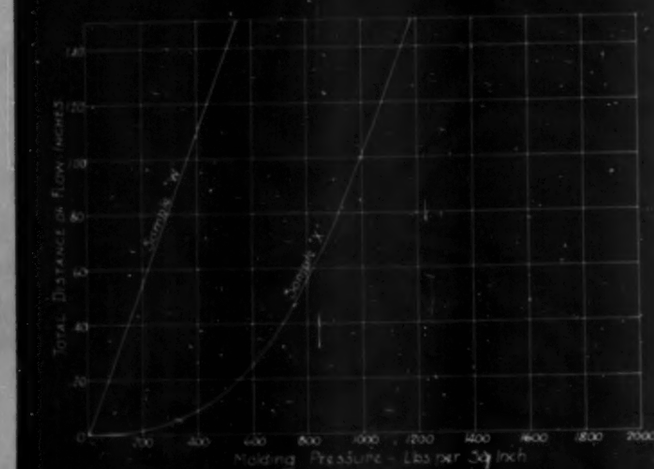


Fig. 24

DISTANCE PRESSURE CURVES SAMPLES W & X

closed chamber but no material can flow up the tube. At any desired time, chosen less than that necessary to fully harden the material, the preheat slide is quickly withdrawn. This may be done without release or disturbance of the molding pressure. The material will then flow up the 1/8 in. tube in cone 16 until it stops its own flow by hardening. Since some of the reaction has already taken place and has partially hardened the mass of material, the total amount of flow is likely to be less than if the preheat slide were not used. The test is then repeated at a series of times, usually multiples of 10 seconds, up to that at which the amount of flow becomes .10 in. or less. The amount of flow, measured in inches, is plotted for various times of preheat, and is found to run steeply down to an intercept on the time axis at zero flow. This intercept is called generally the "setting time," sometimes "preheat time."

In the usual type of test where a tablet is inserted and immediately allowed to flow and set, a soft material will flow more easily and sooner than a hard material and will more quickly become spread against the hot mold surfaces. Other things being equal, then, the softer of two materials will by such a test tend to set faster than the harder one. In the preheat test, however, all samples, however different, are reacted just to full set at equal thicknesses, and the softness is not a factor, since the setting time corresponds to zero flow. As a consequence, the usual effect of flow on heating rate, and through it on apparent setting rate, is eliminated.

It is usually found in commercial molding that a "soft" batch of a given formula requires longer to mold to an unblistered state than does a "hard" batch. For this reason the molder usually thinks of "soft" material as being synonymous with "slow" material, and vice versa. By weight measurements it is usually found that a soft batch of a compound will contain more volatiles than a hard one. These volatiles are mostly water, which is converted to steam at molding temperatures, and, together with the air which was in the original compound, create a substantial internal pressure. In order to mold a piece blister-free it is necessary to cure until the increasing rigidity of the compound at the molding temperature has become sufficient to withstand the internal gas pressure without giving way into blisters. The greater the gas pressure due to the high volatiles of a soft compound, the longer the required cure will be. Thus, the "minimum cure" time of a compound is the resultant of at least two variables, first, the reaction creating rigidity, and second, the gas pressure trying to overcome rigidity. This explains why soft compounds ordinarily appear slow when rated by minimum cure time, but the flow tester preheat test now discloses that, when the effect of plasticity on the test is eliminated, a soft material may be fast setting, or a stiff material may be slow setting.

The "minimum cure time" may be defined as the time in seconds required, at a fixed temperature and pressure, to increase the rigidity just to the point where the compound will no longer give way into blisters caused by internal gas pressure, whereas the "setting time" may be defined as the time in seconds required, at a fixed temperature and pressure, to increase the rigidity just to the point where the compound will no longer flow under that pressure.

In general, only the right hand end of the preheat curve, giving the setting time as defined above, is taken, although there are interesting possibilities also in the behavior at shorter times. For example, a given sample will show a certain flow if allowed to start flowing without any preheating period, but if that same sample, in the form of another tablet, be preheated under pressure for 20 seconds, the total distance of flow is likely to be increased by as much as 15 to 20 percent. For other materials the distance may be unchanged, or may decrease. Thereafter, however, the amount of flow obtained from successive tablets, decreases very rapidly as the time of preheating increases. In Fig. 19 will be found a group of preheat curves, from which setting times are read, taken on a group of different commercial materials of various types. All these curves were taken at the standard condition which has been chosen for obtaining setting time, namely, 150 deg. C. and 1040 lbs. per sq. in., using times taken as whole multiples of 10 seconds, with perhaps 5-second intervals for tests near the setting time. Under those standard conditions the usual commercial materials vary in setting time from about 35 to 110 seconds. The three samples which do not reach zero flow on this plot are imported for testing and represent material which in this country would be too slow-molding to be sold.

Applications of the preheat test

Such a range of setting times is only partly attributable to the resin characteristics, since it is well-known that the type of filler has great influence. Very particularly, asbestos, used largely as filler in materials for high-temperature use, is known to increase the apparent speed of setting of materials in which it is used. Since asbestos-filled material in the form of a piece hot from the mold feels so much hotter to the fingers than a similar piece of wood-flour-filled material taken from the same mold at the same temperature and curing time, it seems a safe conclusion that heat conductivity of the filler counts very largely in measurements of the reaction speed of the compound. This heat conductivity probably has its effect mainly in the first part of the molding cycle, while the mass is warming up, and acts to bring the resin more quickly to its reacting temperature.

The temperature has a strong effect in controlling the rate of the hardening reaction, as it does in all chemical reactions. In Fig. 20 are the preheat curves for an ordinary general-purpose wood-filled material, taken at standard molding pressure of 1040 lbs. per sq. in. and at a series of molding temperatures. The setting times are shown in Table XI below. The effect of abnormally low or abnormally high mold temperatures is also clearly disclosed in Fig. 20, since it is obvious that the preheat curves at 120, 130 and 180 deg. C. cannot extend as high as 1.50 in. flow. In this connection the reader may wish to refer to Fig. 8 of the original article (Plastic Products, March 1934, p. 94). *(Continued on page 74)*

NEW PLASTICS OF AERONAUTICAL INTEREST

by AERO RESEARCH LIMITED

The research work that Aero Research Limited is doing in England looking toward the utilization of synthetic plastics for the construction of airplanes was described by Dr. N. A. de Bruyne in the March issue of MODERN PLASTICS. As stated in that article, particular attention has been directed to increasing the proportionality limit and the Young's modulus of a plastic made by impregnating a fibrous filler with phenol-formaldehyde resin. Some new materials developed in the course of this work were exhibited at the Royal Aeronautical Society's Garden Party at the Great West Aerodrome on May 9. The following notes prepared by Aero Research Limited describing these exhibits serve to indicate the progress that is being made in this endeavor to link more closely two relatively new and rapidly expanding industries. G. M. K.

THE ORGANIZATION, AERO RESEARCH LIMITED was founded in 1934 to carry out industrial research of all kinds, but chiefly to develop synthetic resins into materials of use in aircraft structures. Much of our work is necessarily confidential and for this reason some of our more interesting developments cannot be shown, but we have, nevertheless, tried to make this exhibit as illustrative as possible of what we are doing.

Gordon Aerolite

We are showing for the first time samples of a material called Gordon Aerolite which has properties which make it a direct competitor of steel, duralumin or wood. Gordon Aerolite has a Young's Modulus of 5.93×10^6 lbs/sq. inch, a specific gravity of 1.37 and a tensile strength of 17.7 tons/sq. inch. Figures for other materials are given below.

Material	S.G.	Young's Modulus E	Tensile Strength tons/sq. in.	E S.G.	Tensile Strength S.G.
Spruce	.45	1.5×10^6	4.5	3.3×10^6	10.0
Gordon Aerolite	1.37	5.9×10^6	17.7	4.3×10^6	12.9
Duralumin	2.85	10.5×10^6	25	3.7×10^6	8.8
High tensile steel	7.92	30.0×10^6	90	3.8×10^6	11.4

The above figures though of importance are by no means the only criteria by which a material should be judged. High energy absorption, good fatigue properties, incorrodibility, machinability and low cost are all of significance, but from work which we have done on materials of the same type as Gordon Aerolite we have no reason to suppose that this new material will compare unfavorably with present and older materials in these other respects.

Shear bracing Aerolite

In this material the warp and weft of the fabric reinforcement are at 45 deg. to the edge of the sheet and are thus parallel to the principal stresses in the web of a beam. The strength to weight ratio and stiffness to weight ratio exceed those of plywood.

Aerolite synthetic glue

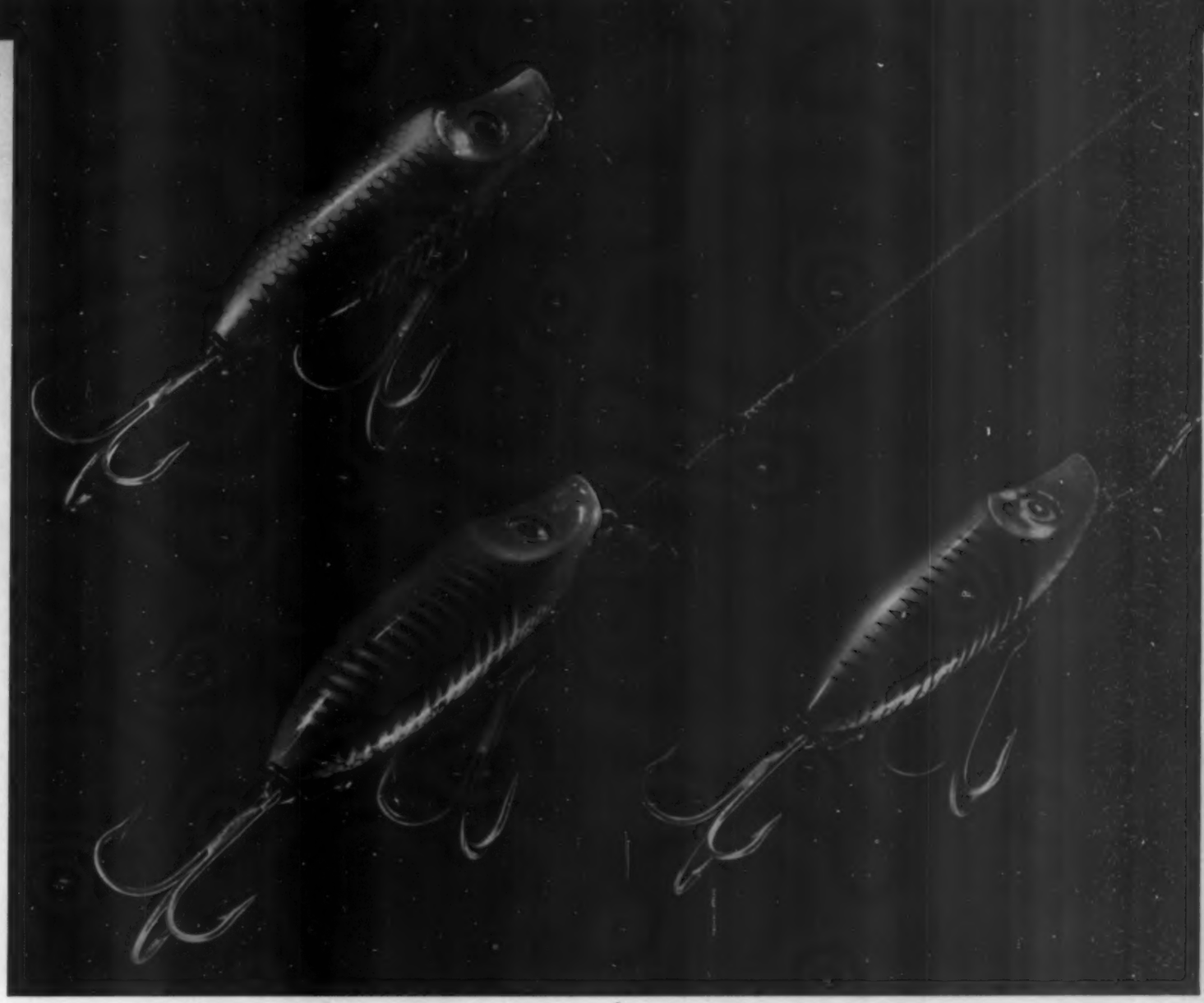
Of direct interest to all concerned in the manufacture of wooden aircraft is the development by Aero Research Limited of a synthetic glue which is now in production. This glue has been approved by the Air Ministry for use in aircraft construction and provides the constructor of wooden aircraft with a glue which enormously increases the strength and durability of his products.

Aerolite synthetic glue gives very strong water resistant and fungus resistant joints. It is a cold glue used in much the same way as casein glue but it can be spread with a brush or it can be sprayed. The strength of the joints is in excess of the requirements of B.S. Specification 3V2 and tests show that the strength is actually increased by immersion for three hours in cold water.

The glue itself is a thick liquid and before use a quantity of hardening powder is added. It is not necessary that the powder should be dissolved and the glue can be used immediately after the powder has been added. The mixture is usable for at least four hours at normal temperatures. The rate of setting of the glue is controlled entirely by the temperature of its surroundings; variations in humidity do not affect it. Normally, the clamps may be removed the next day.

Aerolite synthetic glue, unlike all other glues, is made entirely in this country from raw materials produced in this country. Recent experience has shown that wooden aircraft still have an important part to play in national defence, so there is a real need for a glue whose production is not dependent on the importation of materials from abroad.

While primarily of interest to manufacturers of wooden aircraft, we believe that Aerolite synthetic glue will be of considerable use in good quality veneering and furniture manufacture because of its water resistance and the fact that it does stain or penetrate the thinnest veneers. For veneering work we supply a special hot hardener which, at 90 degrees Centigrade sets in a few minutes. The pressures required are remarkably low and good work can be done with a pressure as low as ten pounds per square inch or less. (*Continued on page 75*)



TENITE *Fish Baits*

TENITE replaces wood in these re-designed Heddon fish lures molded by the General Electric Company. The extreme toughness of Tenite makes the baits practically unbreakable, while its affinity for lacquer provides an indestructible finish in natural colors.

Tenite has qualities which are not found together in any other type of plastic. It is adapted for molding by compression and by the rapid injection process. Unexcelled in shock resistance, Tenite is especially suited for products that must withstand hard usage. It has a low heat conductivity, which makes it pleasant to the touch. It comes in all colors, transparent and opaque, plain and variegated. A 52-page illustrated book describing the uses and molding characteristics of Tenite will be sent you on request.

TENNESSEE EASTMAN CORPORATION *(Subsidiary of Eastman Kodak Co.),* **KINGSPORT, TENN.**

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PLASTICS FOR AUTOMOTIVE HARDWARE GAINING

Abstracted from Cram's Reports
March 20, 1937

INDICATIONS ARE THAT THE SURPRISE PACKage now being prepared for the motoring public in 1938 includes a radical departure in automobile hardware. Plastics—recently developed synthetic resins—are slated to replace certain time-honored metal parts as soon as facilities for molding can be added to hardware manufacturing plants, according to authorities in the industry.

Door handles, both interior and exterior, and window cranks, which for years have been white metal fixtures plated in conventional chromium—and before that nickel and brass—will be made of synthetic resins on several new cars next year, the plastic people insist.

Novel effect possible

The effect should be novel and colorful. Exterior handles which exactly match the finish of the car or provide vivid color contrasts are possible with synthetic resins of the urea-formaldehyde group, of which Plaskon Company, Inc., is one of the outstanding producers. Any of several thousand shades or combinations from water—clear through the pastels to jet black are possible with this type of resin. At the same time, the phenolic resins of the Bakelite type, ranging from light browns to darker shades will be well adapted to match interiors. But the great advantage of these synthetic resins, as manufacturers are beginning to discover, is not in their color adaptability alone. The cost item is something here, as well.

Viewing with justifiable alarm the mounting cost of the ultimate product as one strike after another forces labor prices up in every item that goes into the car, manufacturers this year are once again seeking shortcuts. The plastics appear to offer one of these. The present automobile's door hardware requires a lot of handling. It goes through about 14 processes from the first rough die casting to the finished plated accessory. As it is trimmed, cleaned, washed, punched and plated, quite a number of workmen are required for the process.

Other plastic advantages

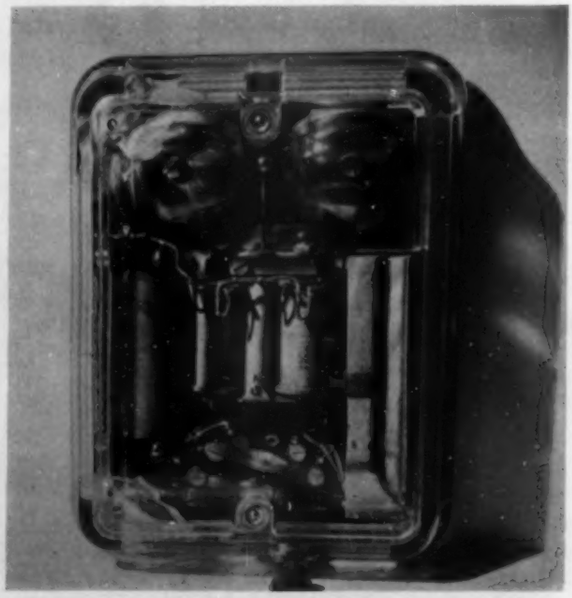
The plastic molding process is much simpler. The resin in powder form is poured into its mold, put to pressure at about 350 degrees, re- *(Continued on page 77)*

NEW USES FOR TRANSPARENT RESINS

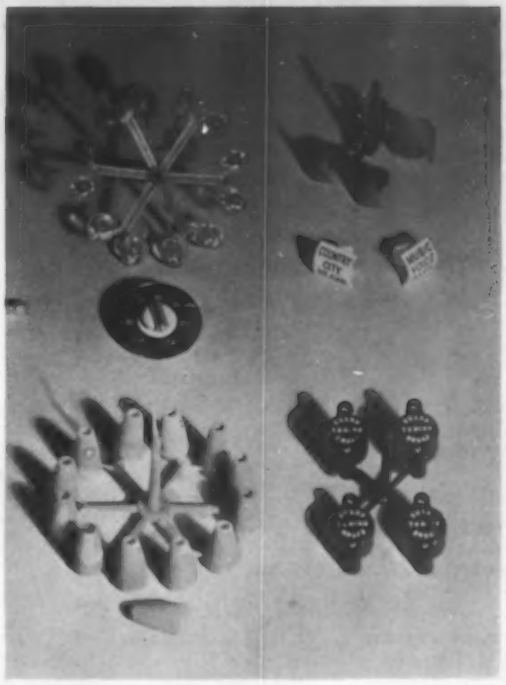
by J. DELMONTE

THE LACK OF BRITTLENESS AMONG THE TRANSparent plastics has made them highly desirable to replace glass. It should occasion no surprise to note that they are finding wide applications in engineering equipment. The cellulose acetate plastics and the transparent acrylic resins are favored in these applications, as both materials are highly impervious to adverse atmospheric conditions and will not discolor.

One of the largest potential markets for transparent plastics aside from safety glass and transparent enclosures, lies in the application to electrical relay and control equipment. As a matter of fact, some of the larger manufacturers of this apparatus, have taken steps recently to investigate the possibilities of applying transparent resins to relay and control equipment to replace glass. The function of an electrical relay is to control the operation of an electrical circuit by effecting certain circuit shifting operations. Invariably, moving parts that open and close contacts are entailed in their operation. It is an established practice to inspect the relays frequently for sticking and cleanliness of contact points, and general satisfactory operation. The units are usually placed under a dust proof cover either of opaque material or else with a glass window for viewing the relay parts. Among the reasons for the lack of glass windows in many installations is the brittleness of the glass, and the high cost of installing or preparing the glass. The usual easy test of attachment with machine screws, is rendered difficult by *(Continued on page 78)*



INSTALLS THIRD H-P-M EXTRUSION MOLDING PRESS



The first H-P-M Plastic Extrusion Molding Press installed by a prominent Chicago molder sold him a second . . . then a third.

A proven production machine—the H-P-M Plastic Extrusion Molding Press has provided this molder with unlimited possibilities in new product design, broadened his market, reduced initial preparatory costs for dies and set-up time and speeded up production.

The H-P-M Hydro-Power Plastic Extrusion Molding Press is completely self-contained and operates hydraulically with all functions synchronized for speedy operation and desirable production economy.

Write for the current issue of THE HYDRAULIC PRESS Magazine containing the complete story about the above installation—if you are not now on the mailing list.

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PLASTIC EXTRUSION MOULDING PRESS

U. S. plastics patents

Copies of these patents are available from the U. S. Patent Office, Washington, D. C., at 10 cents each

MOLDED CELLULOSE FOAM. R. O. Herzog and H. Hoffmann (40% to Eugene J. Lorand). U. S. 2,077,412, April 20. Slabs, blocks or molded shapes of light, cellular material are made by introducing a viscose foam into a mold, regenerating the cellulose by spontaneous decomposition and removing the product from the mold as a solid mass.

COATED CREPE PAPER. Wm. W. Rowe (to Paper Service Co.). U. S. 2,077,438, April 20. Crepe paper is uniformly coated, both within and without the rugosities, with a cellulosic lacquer or a condensation resin varnish.

POLYVINYLACETYLENE. W. E. Lawson and J. A. Arvin (to E. I. du Pont de Nemours and Co.). U. S. 2,077,485, April 20. Polymerizing vinylacetylene in presence of a film-forming material (not acetylenic) and an olefin. The film former may be a cellulose derivative or a synthetic resin.

SHAPED FILTERS. H. Buchloh (to Pen-Chlor, Inc.). U. S. 2,077,512, April 20. Porous shaped articles for use as filters are made of pumice, quartz sand and a granulated ceramic material in a phenol-formaldehyde resin binder which is self-hardening in the cold in about 24 hours.

INJECTION MOLDING. C. Wulff and E. Dorrer (to I. G. Farbenindusttie A.-G.). U. S. 2,077,542, April 20. Making shaped articles by injection molding of a thermoplastic vinyl resin above 120° C.

PHENOLIC RESINS. F. M. Murdock and Chas. S. Webber (to Fiberloid Corp.). Effecting the initial stage of a phenol-aldehyde resin condensation with the aid of an alkaline catalyst partially neutralized with lactic acid, then adding a slight excess of lactic acid before completing the resin condensation.

CONDENSATION REACTION. Wilhelm Kraus. U. S. 2,077,841, April 20. Condensing 1 mol of urea with between 1 and 2 mols of formaldehyde and $^1/_{14}$ to $^1/_{82}$ mol of hexamethylenetetramine, in an aqueous acid medium in which there is not quite enough acid to neutralize all the hexamethylenetetramine, and heating the reaction mixture until it is acid in reaction.

LIGNINSULPHONATE MOLDING COMPOSITIONS. G. C. Howard and L. T. Sandborn (to Marathon Paper Mills Co. and Guy C. Howard Co.). U. S. 2,077,884, April 20. Making hard, dense shaped articles by molding calcium ligninsulphonate, liberally compounded with excess lime, under pressure at temperatures above 100° C.

SHOE PARTS. Geo. Ferguson, by H. F. Tracy and G. B. Redding, administrators. U. S. 2,078, 131, April 20. A reinforced sheet material for use in making shoes comprises a layer of sheet material integrally joined and molded to a layer of wood pulp impregnated with a polystyrene, polyvinyl chloride or polyvinyl acetate resin.

SHEETING PLASTICS. G. J. Esselen and Jacob Lurie (to Fiberloid Corp.). U. S. 2,077,214, April 20. In a continuous method for sheeting plastics (cellulose derivatives or synthetic resins) the sheet is colored by floating a layer of colored liquid on the surface of the bath and feeding a web of the plastic material through the colored liquid into the bath and causing it to emerge at a point where the bath is not covered with the colored liquid, then drying the sheet with its adhering film of the colored liquid.

ETHER RESINS. C. Ellis (to Ellis-Foster Co.). U. S. 2,078,239, April 27. Making a resin by the reaction of hydroxybutyric acid with a polyhydric alcohol.

MATERIAL FOR POLARIZING LIGHT. E. H. Land (to Sheet Polarizer Co., Inc.). U. S. 2,078,254, April 27. A sheeted cellulosic material containing submicroscopic crystals of a light-polarizing compound dispersed throughout the sheet so that light is transmitted without appreciable scattering.

COLLOIDIZING CELLULOSE ACETATE PROPIONATE. C. J. Malm (to Eastman Kodak Co.). U. S. 2,078,261, April 27. Preparing colloidized films of celluiose acetate propionate or cellulose acetate butyrate by dissolving the cellulose acylate in a mixture of ethylene dichloride and a lower aliphatic alcohol and then vaporizing the solvent.

ARTIFICIAL LUMBER. J. V. Nevin. U. S. 2,078,269, April 27. Artificial lumber is made of 70–95 percent wood fiber and 5–30 percent of a resin made from urea, m-cresylic acid and formaldehyde.

NOVELTY FINISH. C. R. Smedley (to Glidden Co.). U. S. 2,078,291, April 27. Coating a surface and then spraying the undercoater with a rubber and synthetic resin composition in such a way that strings or blotches of the sprayed material are forced into the undercoater.

MOLDING COMPOSITION. C. A. Thomas (to Monsanto Chemical Co.). U. S. 2,078,353, April 27. Producing rigid waterproof, acidproof, oilproof articles from a thermoplastic polymerized hydrocarbon, a fibrous filler and sulphur by molding at about 180° C.

LAMINATED INSULATION. O. H. Smith (to U. S. Rubber Co.). U. S. 2,078,422, April 27. Impregnating fibrous sheet material first with a dilute and then with a concentrated solution of metastyrene, drying, laminating the sheets and joining under heat and pressure.

ABRASIVE WHEEL. H. O. Anderson (to Norton Co.). U. S. 2,078,436-7, April 27. Making grinding wheels from an open mesh fabric impregnated with a resinous binder and abrasive grains, and a soft rubber matrix uniting the layers of impregnated fabric into a unitary whole.

RELIEF PRINTING FORMS. M. Hagedorn and G. Kujawa (to I. G. Farbenindustrie A.-G.). U. S. 2,078,535, April 27. A polyvinyl resin relief printing form.

METALLIZING FINISH. J. V. Reardon and P. L. Goodale (to Reardon Co.). U. S. 2,078,808, April 27. A dry powdered paint base which can be dispersed in turpentine or other solvent for use is made of a metal powder and a soluble modified phenol-formaldehyde resin; the coating is suitable for application to steel and other structures.

ABRASIVE ARTICLES. R. C. Benner, O. L. Mahlman and W. D. Rossow; R. C. Benner and R. L. Melton (to Carborundum Co.). U. S. 2,078,830-1, April 27. Making abrasive shapes of a heat-hardened resin modified with quartz powder and filled with abrasive grains; and applying abrasive coatings to materials by coating with a liquid resin and then with abrasive grains and a catalyst to accelerate setting of the resin.

CHICLE SUBSTITUTE. D. M. Jackman (to American Chicle Co.). U. S. 2,078,878, April 27. Compounding a noncrystalline resinous vehicle with a soft and a hard crystalline resin, both the crystalline resins being derived from gum elemi and being devoid of taste, odor or toxicity.

COATING RUBBER. W. M. Münzinger (to Röhm and Haas Co.). U. S. 2,078,881, April 27. Coating rubber articles (for protective or decorative finishes) with vinyl acetate or chloride resin lacquers, or with lacquers containing polymerized nitriles, amides, anhydrides or esters of acrylic or methacrylic acid.

ARC WELDING SHIELD. P. L. Spencer (to Raytheon Mfg. Co.). U. S. 2,079,048, May 4. Covering the glass window of an arc welding shield with a sheet of cellulose acetate.

CONTAINER. L. E. Membrino, Upper Darby, Pa. U. S. 2,079,177, May 4. A container made of a hollow cylinder of transparent cellulosic film with a bottom comprising an opaque, relatively heavy disk which enables the cylinder to stand alone and provides a nonsifting bottom closure.

(Continued on page 72)

LAMPSHADES
one of the many uses for
NIXON PLASTICS

Nixon Lampshade Acetate material is slow-burning, easily sewed and pasted. It is not affected by temperature changes. Obtainable in a variety of beautiful colors—mottled and plain.

Have a Nixon representative consult with you on your fabrication problems.

NIXON NITRATION WORKS, NIXON, N. J.

In addition to Nixonite, from which these lampshades were fabricated, the Nixon Nitration Works produce a full line of Transparent Sheeting for use in making packages, containers, displays, etc., and a full line of Acetate plastics for use by fabricators and manufacturers of plastic parts and products.

Nixonoid, a nitrate material, is available in a full range of colors, mottles and patterns in sheets, rods and tubes. It is in use today and has been found most satisfactory for many years, by makers of a host of products from dress accessories to bathroom ware, from dresser ware to fountain pens.

PLASTICS DIGEST

Introducing a new feature in which we shall list each month the more important articles (wherever published) which are of interest to those who make plastic materials or use them in any way

General

SHELLAC. A. F. Suter. Paint & Varnish Prod. Mgr. *16*, 22–9 (May 1937). A detailed discussion of the Indian Lac Research Institute and the Shellac Research Bureaus in London and New York. The chemical constitution of lac is compared with the natural resins of vegetable origin. The valuable physical properties of shellac are considered as are also the undesirable characteristics. The various uses of shellac are reviewed and the deterioration that takes place during the bleaching of shellac is discussed. The major problems of lac improvement are outlined, including the production of a thermosetting grade and the development of plasticizers for shellac.

COSTUME JEWELRY NOW A BIG-TIME INDUSTRY. E. M. Kelley. Sales Management *40*, 553, 556 (Mar. 15, 1937).

ARTIFICIAL RESINS. H. V. Potter. J. Roy. Soc. Arts *85*, 243–64 (1937).

SYNTHETIC RESINS AND WOOD LIGHT. Maurice Déribére. Caoutchouc & gutta-percha *34*, 20–2 (1937). Fluorescent effects of plastics in Wood light are discussed.

Materials and manufacture

CASEIN IN THE MANUFACTURE OF PLASTICS. Robert Dodd. Chem Age *36*, 229–30 (Mar. 13, 1937). The manufacture of casein plastics by the so-called "dry process," that is, treatment of rennet casein with the minimum quantity of water to obtain the requisite plasticity, is described.

CHOICE OF COLORING MATERIALS FOR PLASTICS. J. Delorme. Rev. Gen. Mat. Plast. *30*, 89–95 (Mar. 1937). Presents lists of dyes and pigments suitable for incorporation with cellulose, synthetic resin and casein plastics. Also includes a résumé of materials for staining these plastics.

LOW TEMPERATURE TAR ACIDS AS RAW MATERIAL FOR THE PLASTICS INDUSTRY. W. D. Spencer. British Plastics *8*, 528,550 (Apr. 1937). A new source of cresylic acids from which phenol can be extracted is made available by the low temperature carbonization of coal, some distillates containing as much as 48% of crude tar acids. The time required for molding phenol-formaldehyde resins made with phenol from this source is greater than in the case of the high temperature tar acids, but this may be improved. The properties of resinous products from low temperature tar compare favorably with the commercial phenolic resins. The materials may also be applicable to the manufacture of paints and varnishes and laminated sheets and boards.

ETHYL ALCOHOL AS A POTENTIAL SOURCE OF PLASTICS. H. Langwell. Chem. & Ind. *56*, 431–2 (May 1, 1937). Brief abstract of a lecture concerning plastics obtainable from acetaldehyde (derived by oxidation of alcohol), from ethylene oxide (derived from oxidation of ethylene), and from ethylene itself which will give styrene when combined with benzene in the presence of aluminum chloride. It was brought out in the discussion that the production of one ton of alcohol from various substances in Germany requires:

Ethylene	1 ton and coal 0.5 ton
or Carbide	2.5 tons and coal 0.5 ton
or Cereals	4.5 tons and coal 2.5 tons
or Potatoes	12 tons and coal 2.5 tons
or Sugar beet	15 tons and coal 1.0 ton.

MOLDED PLASTICS AND COLOR. K. Brandenburger. Gelatine, Leim, Klebstoffe *4*, 222–4 (1936).

UREA - FORMALDEHYDE RESINS—I. Anon. Brit. Plastics *8*, 548–50 (Apr. 1937). Patent review, to be continued. The earliest reference to the compounds of urea and formaldehyde is in 1904 (B.P. 23,569) covering the production of condensation products for pharmaceutical purposes. The first patent of commercial value is cited as that of Haans John in 1920 (B.P. 151,016).

ELECTRICAL INSULATING MATERIALS —XIII. Anon. Brit. Plastics *8*, 555–7 (Apr. 1937). Review, to be continued. Specifications for slate, marble, and ceramics for use in the electrical industry are cited.

HISTORICAL DEVELOPMENT OF PHENOL - FORMALDEHYDE RESINOUS PRODUCTS. Brit. Plastics *8*, 558–9 (Apr. 1937). Patent review, to be continued. This number deals particularly with the use of hexamethylenetetramine as the hardening agent in the two stage process of making phenol-formaldehyde resins for molding compositions.

Molds and molding

INJECTION MOLDING OF THERMOPLASTIC COMPOUNDS. P. A. Delafield. J. Soc. Dyers & Col. *53*, 82–6 (Mar. 1937).

INJECTION MOLDING OF PLASTICS—I. A. Amigo. Brit. Plastics *8*, 552–3 (Apr. 1937). Review, to be continued. After a brief historical survey, the technology of injection molding of metals and synthetic thermoplastic compositions is discussed.

METALLURGICAL ADVANCES AND THE PLASTICS INDUSTRY. Anon. Brit. Plastics *8*, 536–8 (Apr. 1937). A discussion of die steels for molds, new materials and processes for preparing cutting tools, case-hardening of dies, the location of defects in steel parts, and similar developments.

Applications

GLYPTAL RESINS AND THEIR INDUSTRIAL APPLICATIONS. R. Dittmar. Caoutchouc & gutta-percha *33*, 17763–4 (1936). Patent review.

SYNTHETIC RESIN AS A MATERIAL FOR CHEMICAL PLANTS. Anon. Chem. Age *36*, 317–8 (Apr. 10, 1937). Description of various units such as tanks, filter-press plates and frames, pumps and piping, made from a phenol-formaldehyde resin composition having an asbestos filler, known as "Haveg" in the U. S.

PLASTIC MATERIALS. Anon. Electrician *118*, 41 (Jan. 8); 214 (Feb. 12); 359 (Mar. 12, 1937). Review.

PLASTICS FORTIFY AGAINST CORROSION. A. J. Weith. Ind. Eng. Chem. *29*, 380–4 (Apr. 1937). The phenolics, chlorinated rubbers, vinyl esters and pyroxylin plastics have been widely used in many chemical industries, notably in the textile, paper, petroleum, fermentation and photographic industries. The methacrylates may be added to this list, if predictions are realized. The textile industry uses rayon spinning pots of phenolic plastic, which operate continuously for 24 hours a day, 7 days a week in contact with sulfuric acid, sulfur and carbon disulfide. Chlorinated rubber coatings protect paper machinery against chlorine fumes. Pyroxylin is used to supplement the protection of a tar coat on the outside of oil lines. Special coatings with a phenolic base are used to line beer and wine vats, and vinyl esters are used over tin plate in beer cans. The use of plastics as protective coatings and the requirements in the way of surface preparation to insure good adherence are discussed.

THERMOSETTING MOLDING MATERIALS FOR AUTOMOBILE PARTS. Anon. Automotive Industries *76*, 462 (Mar. 20, 1937).

SIZING AND FINISHING WITH NEW MATERIALS. Anon. Textile Colorist *59*, 267–8 (Apr. 1937). Finishing agents made from rosin, vinyl alcohol, linseed oil, waxes, rubber, acetone and methyl cellulose are considered.

Chemical

MECHANISM OF THERMAL POLYMERIZATION AND POLYCONDENSATION. H. Dostal, H. Mark and R. Raff. Ind. & Eng. Chem. *29*, 595–9 (May 1937). Formulas are derived for the kinetics of characteristic polymerization and condensation reactions. Quantitative investigations of the velocity of polymerization of styrene and indene and of the polycondensation of p-cresol and formaldehyde and of ethylene glycol and succinic acid are reported.

(Continued on page 50)

COMPARE METHODS

of fastening covers and parts to plastic cases

METHOD "A"

Mold threaded inserts into case—drive machine screws

Objectionable for several reasons—

1. Threaded inserts are costly.
2. Slows up and complicates molding operation.
3. Insert is not integral part of unit; frequently weakens assembly and adds weight.
4. Small inserts have only limited holding power, and use of oversize inserts increases cost.

This is the slowest, costliest way... security is good

SELF-TAPPING SCREW METHOD

Just drive the Screws into plain holes

By using Parker-Kalon Hardened Self-tapping Screws for fastening the cover to case, a considerable saving has been effected . . . work speeded up . . . fastening security gained. One easy operation does the job. As the unique Screw is turned into a plain hole it forms a real thread in the material. No costly inserts, no difficult tapping, no stripped threads.

Faster—cheaper—more secure than "A" or "B"

METHOD "B"

Tap holes in material —drive machine screws

Unsatisfactory because—

1. Tapping is slow and costly.
2. Tapped threads in plastics are weak. They are easily crossed and reinsertion of screws quickly breaks them down.
3. Usually involves considerable breakage of costly taps.
4. Rejects are high due to stripped and crossed threads, mis-tapped holes, etc.

Almost as slow and costly as "A"—security is poor

This simple job shows how you can get better results for less money in making plastic-to-plastic or metal-to-plastic fastenings.

Whether your product is in the drawing stage or in actual production, go over every fastening. Be sure that the fastest, cheapest, most secure fastening method is used wherever possible.

Where you have a cover, base unit, handle, hinge, knob, name or instruction plate to fasten to a case or housing made of plastic or metal . . . where you have a simple or complicated electrical or mechanical unit to mount . . . it is almost certain that you can use Parker-Kalon Hardened Self-tapping Screws to save time, labor, money and increase security. These unique Screws are coming into general use for such jobs. They provide the simplest, most economical means. And, unbiased tests prove they also make stronger fastenings.

A Parker-Kalon Assembly Engineer will point out where you can save

Common types of fastenings such as those mentioned are obvious opportunities to employ Hardened Self-tapping Screws to advantage. Others are frequently overlooked. That is why hundereds of concerns have profited by having a Parker-Kalon Assembly Engineer make a study of fastening jobs. He is able to give valuable service because he has a specialized knowledge of the different types of Hardened Self-tapping Screws and their application under various conditions, and the possibilities of making a special type of Screw to solve special problems. It has paid seven out of ten molders and assemblers to use this service . . . a strong reason why you should ask us to send a Parker-Kalon Assembly Engineer to check over your fastening jobs. Our engineers do no selling . . . *Parker-Kalon Products are sold only through recognized distributors.* A special bulletin on the assembly of plastics is available. Write for it.

* * *

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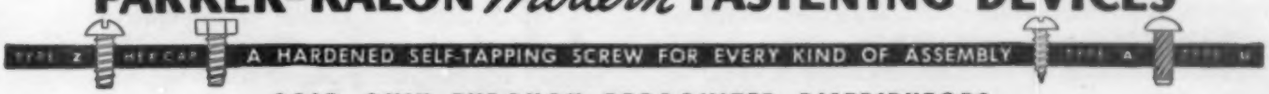

SOLD ONLY THROUGH RECOGNIZED DISTRIBUTORS

PLASTICS DIGEST

(*Continued from page 48*)

THE STRUCTURE OF RESITES. G. S. Petrov and S. N. Ustinov. Org. Chem. Ind. (U.S.S.R.) *2*, 470–2 (1936). Attempts to methylate novolak type molecules of phenol-formaldehyde resin were unsuccessful.

DRYING OILS AND RESINS; INFLUENCE OF MOLECULAR STRUCTURE UPON OXYGEN AND HEAT CONVERTIBILITY. T. F. Bradley. Ind. Eng. Chem. *29*, 579–84 (May 1937). The so-called drying of the drying oils and resins is but a physical transformation involving a conversion of these substances from an essentially linear structure to a three-dimensional polymeric form. The mechanism of this conversion is governed by the specific nature of the reactive or functional groups. Carboxyl and hydroxyl groups are functional with respect to heat condensation, but not with respect to activation by oxygen. Certain forms of unsaturation are required for oxygen conversion, as in the drying oil acids. The well recognized activity of the latter toward both heat and oxygen accounts for the observed close relationship between the oxygen and heat conversions of these unsaturated esters.

KINETICS OF CONDENSATION POLYMERIZATION. P. J. Flory. J. Am. Chem. Soc. *59*, 466–70 (Mar. 1937). Using the data of Dostal and Raff, it is shown that the ethylene glycol-succinic acid polymerization is predominantly a trimolecular process.

DRYING OILS AND RESINS; MECHANISM OF THE DRYING PHENOMENON. T. F. Bradley. Ind. Eng. Chem. *29*, 440–5 (Apr. 1937). Hybrid systems, as typified by the natural drying oils and the oxygen convertible alkyds, in which both addition and condensation mechanisms are effective are discussed. Three types of carbon-to-carbon double bonds are recognized. First, those which occupy a terminal position in an essentially hydrocarbon-like chain, as in methylene and vinyl radicals; the functionality of this type of bond is generally two. Second, those of benzenoid or aromatic character, which are ordinarily observed to be nonfunctional. Third, those which are confined within an aliphatic hydrocarbon chain, as in the natural drying oils. Bonds of this latter type are considered to have a functionality of only one per acid molecule, except that under some conditions, particularly where the acids are possessed of three double bonds, an additional function may be derived. Such considerations suggest that the fatty acids of the drying oils possess a normal functionality of but two, one function resulting from the carboxyl group and the second from the entire system of unsaturated carbon-to-carbon double bonds. Therefore, the drying oils may be expected to form convertible systems when combined with alcohols having three or more active groups and nonconvertible systems when combined with alcohols having a lesser number of active groups.

NEWS and NOTES

American moldings exhibited in London

An exhibition of American moldings was held at Dorland House, Regent Street, London, April 13–17, under the sponsorship of Synplas Ltd. and G. Norman Higgs, a former director of that concern. Several hundred molded items, contributed by many leading molders of the United States, made up the display which was visited by some five hundred invited guests. These guests included those actively engaged in the molding and powder industries of Great Britain and others interested in the use of plastics. Many of them experienced their first opportunity to closely examine the products of our molders here.

The exhibition was open daily from 2 to 8 p.m., and refreshments served to make the affair one of social as well as commercial importance. It was the first time such an assemblage of American moldings was ever shown in England and the effort was considered a smart piece of promotion by those in the trade.

A corner of the exhibit is shown in the illustration above and many of the parts will be recognized by their contributors. The exhibit was initiated by Mr. Higgs while on a visit here last fall, the parts being assembled and shipped to England through the cooperation of Modern Plastics early this spring.

Plastics featured at A.S.T.M. meeting

"Plastics: Some applications of the different classes and methods of testing" will be the subject of the Twelfth Edgar Marburg Lecture which will be delivered by Dr. T. Smith Taylor at 4:15 P.M., June 30 at The

What is the most transparent plastic material?

Which are the strongest plastic materials?

Which are best for industrial use?

What does "cold molded" mean?

What is cast resin?

CAN YOU ANSWER EVEN HALF OF THESE QUESTIONS?

Can you get a white plastic?
Which plastics can be softened by heat?
Which is the most fireproof plastic material?
Can all plastics be sawn and drilled?
What is injection molding?

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MODERN PLASTICS
425 Fourth Avenue New York, N. Y.

NEWS and NOTES

Waldorf-Astoria in New York City on the occasion of the 1937 Annual Meeting of the American Society for Testing Materials. The purpose of the Edgar Marburg Lecture, established in memory of the first secretary of the Society, is to have described at the annual meetings, by leaders in their respective fields, outstanding developments in the promotion of knowledge of engineering materials. Dr. Smith will discuss the properties of the different classes of plastics and their advantages for particular applications. The methods of testing now available will be summarized and the necessity of developing specific test methods for the various classes of materials in order to show their special properties will be considered. Attention will also be given to the usefulness of test methods to both the producer and the consumer and to the significance of the tests to each of them.

Another feature of the annual meeting which will be of interest to the plastics industry is the Symposium on Consistency to be held at 9:30 A.M. on June 29. Present day practices in consistency measurement as applied to different materials will be discussed. Among the ten papers to be presented on this program will be the following dealing with synthetic resins:

"Viscosity Measurements of Rosin and Resins," by W. A. Kirklin, Hercules Powder Company.

"Cold Flow of Insulating Materials," by Robert Burns and Irving L. Hopkins, Bell Telephone Laboratories, Inc.

"Measurements of Flow Characteristics of Plastics," by H. L. Bender, H. F. Wakefield and H. E. Riley, Bakelite Corporation.

Chemical Exposition

The Sixteenth Exposition of Chemical Industries will present a pageant of American industrial recovery in terms of the contributions of chemistry and chemical engineering. The Exposition will be held at Grand Central Palace, New York, December 6 to 11, 1937. Three floors of Grand Central Palace have been reserved and the advance leasing of exhibit space indicates that the 1937 Exposition will be one of the most representative and comprehensive in recent years. Dr. M. C. Whitaker, vice president of the American Cyanamid Company and a distinguished figure in the chemical industry will be chairman of the Advisory Committee of the Sixteenth Exposition.

Buckman leaves Stokes Machine Co.

Howard M. Buckman, for many years in the advertising business in Philadelphia, and more recently advertising manager of the F. J. Stokes Machine Co. of that city, has left the field to accept a position as business manager of George School, at Newtown, Penna. Mr. Buckman's many friends will wish him a successful future in his new field of endeavor. F. J. Stokes Co. advertising will be handled by The R. G. E. Ullman Organization of Philadelphia, Pennsylvania.

NEWS and NOTES

New department at Celluloid Corp.

Celluloid Corporation announces that it has organized a Technical Sales and Development Division whose primary function is to give technical assistance to customers using Protectoid transparent packaging materials for packaging applications of all types; and to those who use Lumarith in its various forms, that is, sheets, rods, tubes, rolls and molding powders. Lumarith molding powders will receive special attention because of their adaptability to injection molding (die casting) a development of considerable interest to the plastics industry and trade molders.

Millard Demarest who has a great deal of experience in the Packaging and Plastics Sales Divisions of the Company will head the new department, assisted by Ralph E. Porzer, formerly a member of the Research Laboratories of the Company at Newark. In addition, Celluloid Corporation has engaged Willis M. Lester for merchandising research. Mr. Lester was formerly with N. W. Ayre & Son, Inc., and Sears Roebuck & Co.

Plant shut-down

In order to minimize disturbances in production and service caused by the vacation given to employees at the Mica Insulator Company, their plant will be shut down completely during the entire week of July 4th. Production will cease on the evening of Friday, July 2nd and recommence on the morning of Monday, July 12th.

W. J. Lawrence resigns from Hercules

William J. Lawrence, a director and vice president of Hercules Powder Company, and general manager of its Paper Makers Chemical Division, recently resigned from the organization to devote his entire time to the many businesses in which he is interested in the Middle West and the South. P. B. Stull, a Hercules director, and formerly general manager of the company's Virginia Cellulose Department, has taken his place as manager of the Paper Makers Chemical Division.

Increased sales for G.E.

Orders received by the General Electric Company for the first quarter of 1937 amounted to $105,747,030, compared with $59,569,879 for the corresponding quarter of 1936, an increase of 78 percent, president Gerard Swope announced recently. This was the largest first quarter in the history of the Company.

Standard colors for kitchen and bathroom accessories

In April, at a conference in New York called by the U. S. Bureau of Standards and attended among others by representatives of manufacturers and retail outlets, a

NEWS and NOTES

series of standard colors for kitchen and bathroom accessories were submitted and approved. This action is the culmination of more than a year's effort by a committee of the Housewares Group of the National Retail Drygoods Association, which worked tirelessly with manufacturers, retailers and consumers in an effort to establish a working basis for standardization of color in kitchen and bathroom accessories.

Consumers have always experienced difficulty in securing satisfactory color match between articles purchased for use in these two important spots in the home where color harmony is essential to pleasing appearance. This difficulty becomes greater when items made of different materials are produced by different manufacturers. With the acceptance of the program outlined by the committee, certain colors having the greatest general acceptance are established as standard, providing a means of reference whereby manufacturers can produce and store buyers can stock items of colored accessories with assurance that the purchaser can obtain items of various kinds and materials, at various times, from various sources that will match one another in color.

The standard colors for kitchen accessories are—white, Kitchen green, ivory, Delphinium blue, Royal blue and red; for bathroom accessories—white, Bath green, orchid, ivory, maize, Bath blue and Royal blue. These colors are numbered for easy identification, for example SBC-00 is the symbol for Bathroom white, or SKC-15 for Kitchen green. Colors may be added or changed from time to time and anyone is free to submit suggestions and recommendations to the bureau as to changes or additions in the color list. These will be referred to a standing committee selected by the U. S. Bureau of Standards which also shall decide when committee meetings are to be called.

In order that consumers may become familiar with the significance of standard colors, it is recommended that articles manufactured to match a standard color be identified by a uniform sticker, tag or other label securely attached to the article.

January 1, 1938 was set as the date at which time it was suggested merchandise in standard colors be generally available for retail selling. Manufacturers can, however, put them into actual production as soon as they wish. The official color cards, consisting of porcelain enamel plaques, will be ready about the first of July and can be secured through the U. S. Bureau of Standards at $10.00 a set. For the convenience of the trade, temporary color samples will be available in New York at the NRDGA offices as well as at the N. Y. Housewares Manufacturers Association, and in Chicago at the Merchandise Mart and the National House Furnishing Manufacturers Association.

The acceptance of this program for standardization of colors for kitchen and bathroom accessories is but the beginning of a movement which may be much more

ambitious than is apparent at the present time. It is not in any sense, intended to discourage the introduction of new colors nor to restrict the production of goods in colors other than those selected as standard. It simply means that the colors in greatest demand by consumers will adhere as closely as possible to the standards set, for ease in matching accessories.

Tech-Art moves

Tech-Art Plastics Company, which for a number of years has been located at 21–21 41st Avenue, has moved to a larger and separate building at 41–01 36th Avenue, Long Island City, N. Y. R. R. Rochester, manager of the company, says that with the new equipment which has been added and with the increased space, the plant is in a position to better handle its rapidly increasing business. Tech-Art Plastics Company, as its name implies, devotes much of its attention to the technical development of difficult moldings for industrial plants. The plant is now running three shifts a day.

Honors from England

On March 11th, 1937, the University of Edinburgh, England, bestowed upon Dr. Leo Hendrik Baekeland, president of Bakelite Corporation, an honorary degree of Doctor of Laws. This degree will be formally conferred upon Dr. Baekeland on July 2nd. He was also recently elected a life member of the Royal Society of Arts, London. Dr. Baekeland is founder and president of the Bakelite Corporation, manufacturers of plastic materials. Last summer he was chosen as recipient for the Pioneer Cup of the Chemical Foundation and the Farm Chemurgic Council in recognition of his achievements in chemical research as "founder of the plastic industry—an American pioneer of the 20th Century."

William H. Lane

It is with sincere regret that we note the passing of William H. Lane, president and treasurer of the Standard Pyroxoloid Corporation, Leominster, Mass., on May 14.

George A. Rhoads

We also regret exceedingly to have to report the death of George A. Rhoads on May 8. Mr. Rhoads was senior partner of J. E. Rhoads & Sons, Philadelphia, where he had been associated since 1888.

Tenite in Australia

R. E. Elford, writing in the *Argus*, January 30, 1937, describes a New Industrial Romance in Australia in which Tenite, product of Tennessee Eastman Corp., and Die Casters Pty. Ltd., Melbourne, manufacturers of automobile hardware, play leading roles. He says in part:

"Because of limited resources for experiment few Australian manufacturers have the satisfaction of producing an article which has defied the best brains oversea.

"In the United States, Great Britain, and Germany,

CLASSIFIED

➡ **WANTED—PREFORM MACHINES: Will pay cash for idle or surplus preform Presses—also Hydraulic Presses, Pebble Mills, Mixers, Sifters, etc. Send us your list. Reply Box 191, Modern Plastics.**

●

➡ **OPPORTUNITY TO VISIT MEXICO: Wanted by established factory, a specialist in the manufacture of buttons and buckles in Casein, Bakelite, and other Plastics, willing to spend six months in country reorganizing factory and bettering production. Write Apdo. 181, Mexico City, D. F.**

●

➡ **WANTED—A man of ability as a sales representative for a rubber company well known in the field of rubber and plastics. Working knowledge of rubber desirable, knowledge of plastics essential. Age not over 45. Reply Box 193, Modern Plastics.**

●

➡ **WANTED, Man capable of assuming duties of General Manager in large molding plant. Reply Box 194, Modern Plastics.**

●

➡ **POSITION WANTED: Manager Specialty Division of large molding concern desires to make new connection, preferably in the East. Graduate engineer, ten years diversified experience in all phases of plastic molding. Reply Box 195, Modern Plastics.**

●

➡ **Active ambitious man familiar with plastics and acquainted in the jewelry and novelty fields wanted to represent molder who is well equipped to serve those fields. Write fully to Box 196, Modern Plastics.**

●

➡ **FOR SALE: 1—Colton No. 5, Preform Machine 2½", with texrope drive and motor. Reply Box 197, Modern Plastics.**

NEWS and NOTES

many unsuccessful attempts were made to find a satisfactory process by which cellulose compounds could be molded on metal cores. A Melbourne firm made the attempt also and succeeded, using an American cellulose acetate compound called Tenite, German machinery, and an Australian metal core. Australian craftsmanship has given the world a new type of hardware which will beautify homes and cars, telephones and jewelry, radio sets and refrigerators. It can be produced in an unlimited range of colors and styles. The ingenuity of Australian craftsmen in achieving this success has attracted comment from leading industrialists in other countries.

Automobile hardware manufactured by Die Casters Pty. Ltd. using this process, was exhibited in MODERN PLASTICS COMPETITION, 1936.

We beg your pardon

Editor, MODERN PLASTICS:

We would like to thank you for publishing photographs with reference to the British Industries Fair in your April number.

We get the impression, however, that the "Philco" Radio Cabinet was manufactured by Messrs. E. K. Cole. This of course is not the case. The "Philco" Radio Cabinet was designed and manufactured by us for the Philco Radio Corporation, who are direct competitors of Messrs. E. K. Cole in the English radio market.

You will appreciate that this misunderstanding might have rather serious results, and we should be very much obliged if you could find space to publish a correction in a future issue.

Yours faithfully,
Thomas de la Rue & Co. Ltd.

Shern-Hall Street
Walthamstow, London
May 4, 1937

A quarter-century of applied research

Ten new industries have been brought into being through applied research fellowships of Mellon Institute during recent years. These, and the development or invention of about 650 new processes and products, are among major accomplishments of the Institute since its founding in 1913, according to Dr. Edward R. Weidlein, its director. The Institute dedicated its new building May 5–9, with visiting scientists and industrial leaders from many parts of the world attending.

The Institute's work with vinyl and other resins, leading to large-scale production of five new plastics, has been especially notable. Another, dealing with the study of acetylene, resulted in a bewildering list of new organic compounds and formation of a new chemical company for their manufacture. A third, leading to discovery of an edible synthetic sausage-casing from cottonseed hulls and a way to make it on a large-scale com-

mercial basis, succeeded in "putting cotton shirts on wieners." A fourth succeeded in wresting from ethylene a list of 75 new derivatives, again causing the birth of a new chemical company. Another paved the way for the manufacture of important chemicals from cane-sugar.

New industries also have been built on the results of applied research into the recovery of various by-products from coal and coke, some of them resulting in such products as disinfectants, fungicides, insecticides, varnishes, paints, resins, electrical insulating materials, turpentine substitutes, substitutes for linseed oil, wood preservatives and many other branches.

Celluloid personnel

On May first, William M. Porter became acting director of sales of the Plastics Division of the Celluloid Corp. with headquarters at the N. Y. office. On June first, Ralph S. Gavitt became district manager with headquarters at Leominister, Mass.

New plans for Russell Wright

For the last five years, in addition to managing his own manufacturing business, Russell Wright has been actively engaged as an industrial designer in the home furnishing field. In order to free himself for the steadily increasing demand for his design services, two new and separate organizations have been formed. One is called Russell Wright Associates and is located in penthouse offices and workshop at 130 East 40th Street, New York City. The other will be known as Wright Accessories, Inc., with display rooms and factory location to be announced later by that company.

Representatives of Roxalin

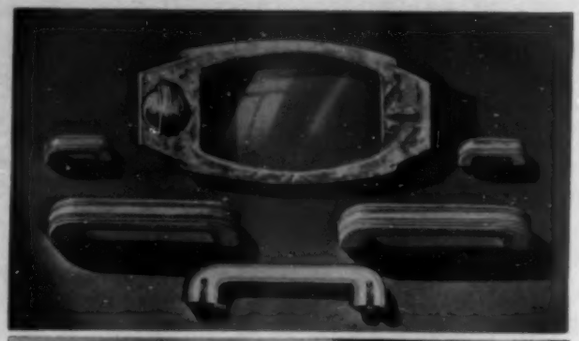
Fred Hurst, representative of Roxalin Flexible Lacquer Company, Inc., has been stationed in the Chicago area. He is located at 5855 North Mobile Avenue, Chicago, Ill. Mr. Hurst is a practical finishing man, with a background of 16 years as supervisor in the finishing departments of the Waterbury Manufacturing Company and Volupte. Mr. Hurst moved to Chicago after a year of training in the Roxalin Laboratory.

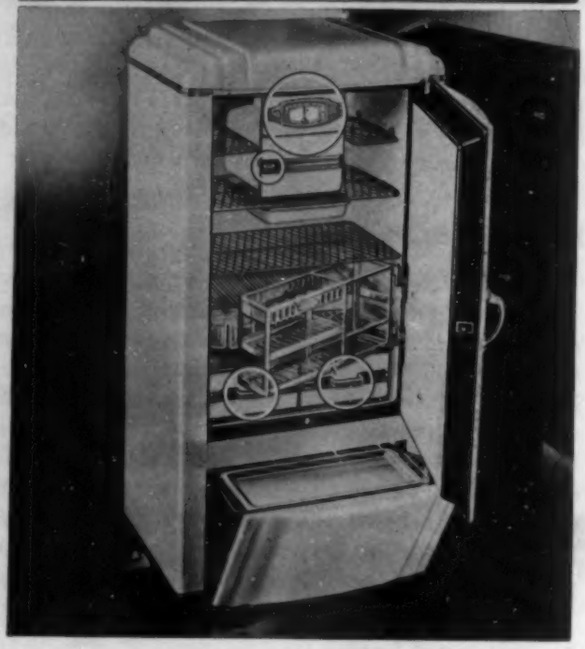
Howard Verrault is now representing Roxalin Flexible Lacquer Company, Inc., in the upstate New York territory, making his headquarters in Rochester, N. Y. Mr. Verrault has gone through a year of intensive training in the Roxalin Laboratory.

Handles of Tenite

Plastics decorate the ice-box. This group (illustrated next page) consisting of large and small handles, temperature control knob and plastic bezel, injection molded of Tenite by Erie Resistor Corporation, adds color and beauty to the 1937 Stewart-Warner refrigerators. An unusual feature of the large handles used on storage drawers is that a thin shell, approximately 1/8 in. in

NEWS and NOTES





thickness, is molded around a zinc die-casting. Thus, to the beauty and depth of color of plastics is added the strength of a metal handle. This is the first time in America that molding around large metal cores has been accomplished on a production basis.

The bezel molded of Tenite is the focal point of interest in the interior of the ice-box and represents a distinct achievement in the art of molding around glass in a single operation, which was developed by the Erie Resistor Corporation. The bezel frames a gage that indicates the temperature of the box. The plastic frame is $3\frac{1}{4}$ in. by 8 in. overall. The escutcheon is attached by means of four gates formed in the molding process.

Decorating note

A new departure in plastics is the appearance of the decorative strip. This is something which designers and manufacturers have had in mind and have experimented with for some time, but which now becomes very practical because of the development of the Tinnerman speed nut as a means of affixing the strip.

The strip, as used by Tinnerman Stove and Range Company on its current ranges, is a piece of Plaskon,

in red, green or white, measuring 8 inches in length by 7/16 in width. On the back are three 1/4 inch long projections which fit into the piece to be decorated. The speed nut is a small piece of steel with two teeth so cut as to slide easily over the end of the projection and to cling there tightly and firmly. The fastening is extremely strong, yet the nut can readily be removed by giving it a half turn, when the teeth disengage.

This strip is already appearing on ranges and will shortly be seen on radio cabinets, boxes and any similar large surfaces which can be relieved by contrasting decoration. Affixing the strips is a matter of a second or two in time and very little effort.

Heat indicating paint

A new kind of paint, for heat-warning and heat-testing, changes color when exposed to sufficient heat, then returns to its original color when the excess heat is removed. Made by the Efkalin Company, this paint offers a brand new medium through which maintenance and production engineers can detect serious deviation in temperature in processing equipment, power machinery transmissions, etc.

A series of five permanent changes and seven retroactive color paints are available. The former change at temperatures ranging from 300 F. to 734 F.; the latter from 104 F. to 464 F., with a safety margin of 25 deg. Each of the temperature changes is sharp and wide, leaving no room for doubt or question as to the heat of the object to which it is applied. Permanent-change paints require recoating after each change, while the retroactive type is good for from 25 to 50 changes or more without recoating.

World's Fair directors

Thirteen new members were added to the Board of Directors of the New York World's Fair of 1939 at a regular monthly meeting in the Empire State Building. The membership of the board was raised to 45, representing the principal lines of business, industry, civic and official life. Among those elected were Lewis H. Brown, president, Johns-Manville Corporation; Andrew W. Robertson, chairman, Westinghouse Electric & Mfg. Co.; and Gerard Swope, president, General Electric Co.

New resin sealer

To make the finishing of wood and wood products easier and more economical a new, clear sealer and preservative, based on a combination of synthetic resins in a special solvent has been introduced on the industrial market. Its trade-marked name is Laux Rezite Sealer.

Applied at the factory on plywood, sash and doors, millwork, etc., immediately after sanding, it provides an economical, ready-primed surface for quick, easy, beautiful decoration. Its chief virtue is the prevention of grain-raising, the most difficult obstacle in the painting, enameling, lacquering or staining of woods, particularly

NEWS and NOTES

in the soft-wood classification. By preventing grain-raising, especially in the presence of moisture, and by priming and sealing the surface, it makes it possible to decorate woods so treated with a minimum of coats and hand sanding.

Laux Rezite Sealer was developed by I. F. Laucks, Inc., especially for the fir plywood industry, but it adheres to all paintable surfaces, which include not only wood but canvas, paper, fabrics, metal, brick and cement. Because of its quick drying feature, it is especially suited to factory use and may be applied by brushing, dipping spraying, or by special spreaders. In addition to preventing grain raising and making a sealed, primed surface for all kinds of decoration, it also decreases moisture absorption, prevents decay, and diminishes surface checking in woods.

Clarice Saymon moves

The studio of Clarice Saymon, located for the past four years at 30 Rockefeller Plaza recently moved to new and larger quarters at 9 Rockefeller Plaza. Miss Saymon and her associates have for a number of years been actively engaged in the design of industrial products and in the decoration of homes and public buildings.

A display of plastic items designed by Miss Saymon will be exhibited and the Practical School of Decoration and Design will be conducted at the new address.

Portable demonstration laboratory

The $15,000 portable laboratory unit No. 7 recently completed by the Standard Oil Company has an exceptionally pleasing appearance due to the curly maple Micarta finish used for panels and bases of the demonstration apparatus.

The portable unit was constructed to enable the Standard Oil Company to help the engineers and others connected with lubrication of hundreds of bearings in industrial manufacturing organizations to solve their lubrication problems.

BOOKS and BULLETINS

Booklets reviewed in these columns will be sent without charge to executives who write for them on their company letterheads. Other books will be sent postpaid at the publishers' advertised prices

The Making and Molding of Plastics

By L. M. T. Bell
Published in England. Distributed by Chemical Publ. Co., N. Y.
Price $5.00

In this 238 page cloth bound book, Dr. Bell has set out to provide an easy and ready means for all those engaged in the industry to study the materials with which they work. The book lays emphasis on the more important materials and processes, and gives very little prominence to lesser-known substances, however excellent they may be. The text is written in a simple straight forward story beginning with an introduction of plastic materials to industry. Dr. Bell begins with Ebonite and hard rubber, explains masticating, mixing, molding and finishing. And gives tables of properties which classify the application to which the various materials are suited. He explains pitch and bituminous compounds, phenolics, ureas, casein, coumarone, cellulose compounds, Leucon, vinyl and Glyptal resins, single and two-stage resins. There is a chapter on testing raw materials, another on testing and inspecting finished parts. Molds and plant equipment are outlined and illustrated, and there is an interesting description of injection molding and mold design. To readers who do not fully understand the structure and properties of molding compounds, this book should be of real help. E. F. L.

Zur Entwicklung Der Chemie Der Hochpolymeren

Published by Verlag Chemie G. m. b. H.
Price 2.80 RM

A paper bound book of 215 pages contains fifteen articles by well-known German scientists and professional men. It surveys the development of the chemistry of plastics, its problems and its rapid expansion up to the present time. It is printed in the German language.

107 Practical Methods of Minimizing Payroll Taxes

by A. H. Berger B.C.S., C.P.A.
Published by Tax Consultants of America, Inc.
Price $3.00 160 pages

This book on minimizing taxes is written for the layman in non-technical language, and it is claimed that any of the suggestions may save an employer hundreds of dollars annually. The author feels that every taxpayer should understand thoroughly and intelligently the laws and should be acquainted with the methods of reducing his taxes to their legal minimum. The book is written by an expert tax consultant and certified public accountant reported to have made an exhaustive study of social security legislation. J. M.

BOOKS and BULLETINS

Flexible metal hose

With a profusion of illustrations, the new catalog of the Chicago Metal Hose Corporation, tells a comprehensive picture-story of the how-when-and-where to use flexible metal hose to advantage. Technical data is given on the use of flexible metal hose for saturated steam and superheated steam, for the conveyance of fluids and chemicals, and numerous special uses such as vibration absorbers for compressors, pumps and turbines, compensators for high temperature pipe lines, equalizer connections for gas burning furnaces.

In addition to this information, the book illustrates and explains the latest developments in flexible metal hose design and construction which, it is pointed out, paves the way for new economies and new high performance records. Two distinct types of tubing, annular corrugation (Rex-Weld) and spiral wound (Rex-Tube) are treated in detail, providing a valuable reference guide to users of either or both of these types of tubing.

The Story of Plastic Molding

Chicago Molded Products Corp. has just issued a forty-page book titled "The Story of Plastic Molding" which is interesting reading to any industrial designer or engineer who wants to know how molds are made and used or how to figure approximate costs of molded parts from various capacity molds. A number of subjects, pertinent to the successful production and use of molded plastics, are discussed including design, molding materials, inserts, etc., and comparative physical properties of the various materials are listed in a graphic and understandable way. Nearly half the book is devoted to the description of standard parts which are available from this company's own molds. Photographs and line drawings are used for their illustration.

Plexiglas booklets

Two booklets have been issued by Röhm and Haas Company, Inc., on the properties and uses of Plexiglas, one for the aeronautical field and the other for general industry. Both books discuss the general, optical, electrical and chemical properties of acrylic resins.

Suggestions for use and applications of Plexiglas are included. The material is available in transparent or opaque sheets in thicknesses from .030 to .500 inch either water white or in a variety of colors, and there are directions in the booklets for handling, cutting, bending, polishing and cleaning the material.

Stokes bulletin

A four-page folder describing the Stokes-Standard preforming press and briefly mentioning other preforming presses has been published by F. J. Stokes Machine Company. Included in the booklet are features of construc-

BOOKS and BULLETINS

tion, models available, specifications and illustrations both of the presses and of typical preforms. One illustration shows nearly a hundred different shapes of tablets which indicates the scope of these machines to preform molded materials into almost illimitable sizes and shapes.

G. E. booklets

General Electric Company announce the publication of the following booklets and folders which are ready for immediate distribution. *Low-speed Synchronous Motors, Pressure and Vacuum Switches, Lightening Protective Equipment; Watthour Meters, Fractional Horse Power Motors and Surface Air Coolers.*

American Metal Hose bulletin

A sixteen page booklet describing seamless flexible tubing has just been published by the American Metal Hose branch of The American Brass Company.

Essentials of construction, advantages and applications as well as typical installations are some of the subjects covered. A properties chart of specifications together with many illustrations of the different applications, fittings and couplings leave little to the imagination.

Elmes Engineering Works folder

"Plastic Moulding Plants" is the subject of a four-page folder issued by Charles F. Elmes Engineering Works, describing all types of presses and a few accumulators. Illustrations and specifications are given for each installation included in the booklet.

Automatic Temperature Control bulletin

A four page folder describing several types of automatic timers involving the design of special equipment where standard timers were not applicable has recently been issued by the Automatic Temperature Control Co.

Trans-O-Meter

A catalog section describing the Westinghouse Trans-O-Meter, a simple portable device for measuring the transmittancy of flat materials has been announced by the Westinghouse Electric and Manufacturing Co.

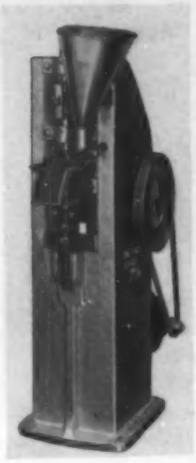
Stokes water stills

An eight-page leaflet just issued by the F. J. Stokes Machine Company describes briefly their line of laboratory and smaller industrial type water stills. Attractively printed in two colors, it contains illustrations of the various models, specifications and prices.

SHOP EQUIPMENT

(See also Books and Booklets)

Kux-Lohner presses



Single punch and rotary tablet presses are being manufactured for preforming plastic molding materials by Kux-Lohner Machine Company. Presses were designed to handle free flowing powder or granulated material that will hold together through the application of high pressure. Single punch models will produce preforms from 9/16 in. maximum diameter up to 4 in. maximum diameter, at the rate of 30 to 125 tablets a minute, while rotary presses are equipped to produce 150 to 1000 tablets per minute from 5/8 in. to 3 in. maximum diameter. A descriptive folder is available for those who are interested in securing further information.

Small flat drills

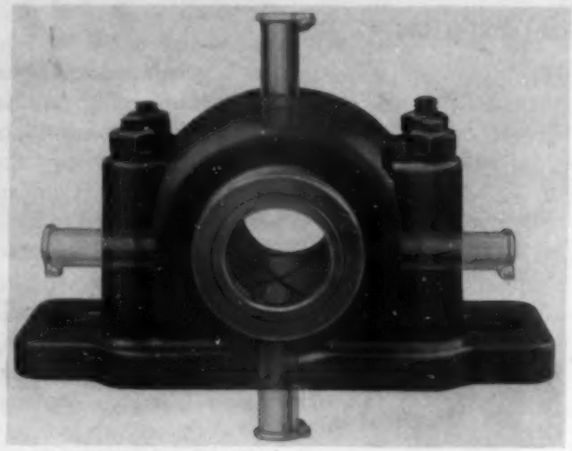
F. L. Grobet, the Swiss file manufacturer, represented in the U. S. by the Grobet File Corp. of America, has succeeded in making small flat drills in high speed steel in diameters ranging from .002 in. to .100 in. Formerly these small drills were made only in carbon steel, and the making of such minute drills in high speed steel gives increased accuracy and greater production at less cost. These flat drills are guaranteed to be accurate in dimensions and absolutely centered. One drill will make up to 15,000 holes and still retain its accuracy of diameter, it is claimed.

Randall Universal pillow block

Because it is often impossible to know in advance of a machine installation how the pillow blocks will have to be mounted, the Randall Graphite Products Corp., has developed a Universal-type double reservoir oil return pillow block that can be mounted in any position, according to the requirements of each individual installation. With this pillow block, it is necessary only to select the mounting position needed, unscrew the oil cup, turn the ball to this position and reinsert the oil cup vertically.

There are two large reservoirs in the spherical ball. A supply of oil is placed in the upper one which feeds the shaft as needed through graphite feed plugs and graphite pressure-packed channels. Oil recovery grooves divert unconsumed oil into the lower wool packed reservoir. This oil is again fed to the shaft and bearing through lower graphite feed plugs. The Universal pillow block is claimed to hold almost three

SHOP EQUIPMENT



times as much oil as the standard type and will therefore operate for much longer periods on a single oiling. The Universal bearing is self-aligning and is precision bored on Ex-Cell-O equipment to close tolerances. According to the manufacturers, it has a greater bearing area than standard types and will operate efficiently on high speed applications.

New G-E rotating-cam switches

A new line of rotating-cam switches, designed especially for built-in control applications and adaptable to a variety of electrical functions and machine requirements, has recently been placed on the market by the General Electric Company.

For non-built-in applications, the devices are available as standard switches without the flanges used for flush-mounting on machines. Designated as G-E CR3300 rotating-cam switches, the new line is manufactured in a number of electrical and mechanical modifications making it universally adaptable to applications varying from machine-tool motor control to steel-mill master switching. Descriptive folder is available.

New laboratory heater

Supplementing its present line of laboratory heaters and hot plates, the Precision Scientific Company, announces their new Ful-Kontrol Laboratory Heater, which adjusts from 0 to 750 watts, for mild or intense heating. A new bulletin has been issued to describe it.

For marking samples

The Ideal Electric Marker, a new and inexpensive portable tool, for marking on practically any material, whether metal or non-conductor, is announced by the Ideal Commutator Dresser Company. Legible and permanent records can be quickly, easily and safely made on metals and alloys; on dies, tools, plates, sheets, shapes, rods, forgings, castings, pipes, equipment; and also, on

glass, pottery, ceramics, hard rubber, plastics, fiber, and similar materials.

Its uses include: Writing owner's name on tools or equipment to prevent theft; writing manufacturer's name, price, stock number or trade name on nameplates, glassware, test tubes, and other products; identifying parts in store rooms; writing company name, sizes, etc., on tools in the tool room.

The instrument is "handsize," $6^{3}/_{4}$ in. overall, weighs 2 pounds, and is as easily handled as a pencil or crayon. It requires no cabinet, auxiliary controls, rheostats or transformer for operation. The point does not stick into the marking surface. It makes permanent lines, cut right into the surface, that cannot be removed by ordinary wear and tear of handling.

Ideal Commutator washer punch

A washer punch which cuts washers out of metal, plastics, fabric, fiber steam packing, gasket material, asbestos, leather, straw-board, felt, cork, rubber, mica or any similar material up to $^{1}/_{16}$ in. thickness, is manufactured by the Ideal Commutator Dresser Company.

Dies are mounted in an eccentric turret plate which places them all as close to the edge as possible and makes it more convenient to center and withdraw the washers. 150 different sizes are obtainable.

Motorized experimental tablet machine announced

A small motor-driven tablet making machine for compressing pharmaceutical specialties on a small scale and for experimental compressing work in industrial laboratories in the chemical, electrical, ceramic, food and other industries has recently been placed on the market by the F. J. Stokes Machine Company. This machine is a motorized model of the Stokes Eureka Tablet Machine which, in its hand-operated form is widely used all over the world. It is rugged and easy to clean and "changeover" for different size tablets, has an output up to 100 tablets per minute in sizes up to $^{1}/_{2}$ inch (1.27 cm.) in diameter. Tablets are accurate in size and shape and of uniform density.

LITTLE DETAILS WE MISSED

W. F. Kaynor, president of Waterbury Button Company, who recently returned from England on the "Queen Mary," reports that he discovered the following plastic items used in the construction of the suite he occupied.

In the stateroom there were 8 light fixtures, 3 door knobs, 3 door locks, 17 mirror holders, 18 drawer pulls, 2 carafes with stoppers, 10 switch plates, 14 switch handles, 2 clothes closet pulls, 12 single coat hooks, 3 double coat hooks, 2 tie holders, 1 jointed rod, 9 curtain rings, 3 plates marked "valves," 3 bureaus plastic veneered, 2 beds plastic veneered, a plastic waste basket, telephone, two black and white ash trays, an electric clock case and 5 curtain pull backs.

In the wash room there were 4 small towel hooks, 4 mirror holders, 2 carafe holders, 1 smaller bottle holder, 2 faucet handles, 2 cupboard handles, toothbrush holder, 2 black buttons on the cabinet, switch plate and handle, bar towel holder, curtain rod, 9 curtain rings and lighting fixture also made of plastics.

In the bathroom was another lighting fixture, a double hook with metal back, 2 small towel hooks, 2 door knobs, 2 slide locks for doors, wall switch plate with handle, 2 tubes for steward call, safety handle over the tub, 4 water heaters, toilet seat and lid, double paper holder, carafe holder, large soap dish, water glass holder, faucet handles, handle and button on cupboard, black and white ash tray attached to the wall, and toothbrush holder. In addition to these the bathroom was entirely paneled with laminated material.

At the time the "Queen Mary" made her first voyage to this country, MODERN PLASTICS pictured the interior and indicated that some $100,000.00 worth of American made laminated material was used in the public and private rooms because of its light weight and fire resisting properties, but it remained for a traveler directly connected with the molding of plastics to spot these details of which there evidently are a great many.

NEW TRIM FOR BOOK COVERS

New and individual is the effect of inlaid plastic letters and symbols, on the latest book covers produced by the National Publishing Company. Specializing in covers for college annuals, albums, loose leaf devices, and books, this company features unusual yet appropriate materials to express the distinctive features of particular contents. Cast resins, because of their wide range of color, durability and permanent lustrous finish, proved a practical and decorative medium.

The University of Pennsylvania "Record" presents one of the most distinctive covers using this new medium. On a dark blue leather cover, measuring nine by thirteen inches, "The Record" is tooled across the top, while the year is marked in the same way across the bottom. Slightly above the center, the letter "P" in a rich maroon tone of cast resin is inlaid in a two and a half by three inch frame. The Nursing School has a red plastic inlaid cross on plain black leather. A brilliant red "R" is Rutgers University's "Scarlet Letter."

The policy of National's art department is that a good cover cannot be created independently of the book itself but that it must originate and be built from within the pages of the book. The Catalin used is easily carved into any figure allowing infinite variety to secure individuality for the book.

EXPERIMENTAL MOLDINGS AND MODELS

Molding plastic materials presents quite a different picture than manufacturing with other materials. Models can be made in the same manner but to interpret these models into plastic materials for original observation and comparison and to work out manufacturing plans and details before production is begun is sometimes a problem.

With metals, for example, models can be hand shaped. They can be hammered and bent. But not with plastics, they are manufactured in a different way. It is true that models can be carved, or turned, from cast plastics and a very accurate model obtained with all the finish and appearance of the product as it will appear when completed. But this gives no assurance that the object will be satisfactory or practical to mold.

The only way this can be definitely assured in advance of production is to make an experimental single-cavity mold and test it under actual molding conditions. In this way, undercuts are avoided, or if they appear, they can be corrected. Tolerances may be tested. Inserts definitely positioned. And all other manufacturing and molding conditions can be determined before a multiple cavity or production mold is built.

The Stricker-Brunhuber Corporation, for a number of years has been analyzing the difficult problems involving the molding of plastics and many of the prominent moldings with which we are all familiar have had the

benefit of their experience before production molds were built. This company makes original patterns from drawings or specifications, developing them either in wood or cast plastics for the approval of clients. When the models appear to be satisfactory in every way, a single cavity mold is made from which molded samples are taken for final adjustments by the molder or manufacturer for whom they are made. Adjustments are frequently made in the original mold, or when a major change is found necessary, a new mold is built with comparatively small expense. Upon completion of the experimental mold, production molds with as many cavities as required for scheduled production are made and shipped to the molder who has been commissioned to manufacture the molded parts.

The company does not operate a molding plant, it devotes its entire energies to the solution of experimental problems and to the development of production molds that really work. In its experimental work, models are often made of cast resins or sheets of cellulose acetate which are cemented together. For example, an inkwell was recently made from transparent Lumarith in such a way that the entire construction of the well was visible at a glance. This permitted the mold maker to see the internal, as well as the external, construction and to eliminate any difficulties before they occurred.

U. S. PLASTICS PATENTS

(Continued from page 46)

PHENOL-ALDEHYDE RESINS. H. Hönel (to H. Reichhold, Reichhold Chemicals). U. S. 2,079,210, May 4. Condensing an aralkylated phenol with formaldehyde and then with a drying oil.

MOLDED ARTICLES. F. Fischer and O. Horn (to Studien- und Verwertungs-Ges. m. b. H.). U. S. 2,079,343, May 4. Making hard, heat-resistant molded insulation by intimately mixing an arylamine with lignite or anthracite and molding under pressure at 150–180° C.

OIL MODIFIED RESINS. A. A. Drummond, G. Cross and H. H. Morgan (to Imperial Chemical Industries, Ltd.) U. S. 2,079,606, May 11. Making an oil modified phenolic resin by condensing a phenol and an aldehyde, in an inert organic solvent, with a polyhydric alcohol which is only partially esterified with an oil acid.

MINERAL OIL RESINS. C. Ellis (to Ellis-Foster Co.). U. S. 2,079,607, May 11. Making antiknock gasoline and synthetic resins from heavy oils by cracking the oil in presence of air to form a gasoline fraction with high antiknock value, and also aldehydes; and acting on the aldehydes with a phenol to form a resin, which is then separated from the gasoline fraction.

RESIN VARNISHES. H. H. Hopkins, H. L. Plummer and L. F. Stone (to E. I. du Pont de Nemours and Co.). U. S. 2,079,616, May 11. Homogenizing a polyhydric alcohol with a phenolic resin linseed oil varnish by heat, and condensing the polyhydric alcohol in this system with a polycarboxylic acid to form a new resin in the varnish.

VARNISHES AND RESINS. H. H. Morgan and A. A. Drummond (to Imperial Chemical Industries, Ltd.). U. S. 2,079,626, May 11. Making synthetic resin varnishes by alkaline condensation of a phenol with formaldehyde in presence of a volatile organic solvent, adding an ester of an oil acid and distilling until a drop dries clear on a hot test plate.

PHENOLIC RESINS. H. S. Rothrock (to E. I. du Pont de Nemours and Co.). U. S. 2,079,633, May 11. Mildly acid condensation of phenol with formaldehyde to form a heat-hardenable oil-soluble resin.

CEMENTING PLASTICS. J. F. Walsh and A. F. Caprio; J. F. Walsh, H. E. Smith and A. F. Caprio (to Celluloid Corp.). U. S. 2,079,641-2, May 11. Joining cellulose acetate objects to like or different surfaces, without damage to colors therein which may tend to bleed, and without the aid of volatile solvents, by means of a cellulose acetate plastic cement heavily compounded with an alkyl phthalate plasticizer.

VARNISH RESIN. I. Rosenblum. U. S. 2,079,926, May 11. Making a resin for oil varnishes by carrying out a phenol-aldehyde resin condensation in presence of a natural resin and then continuing the condensation with a polyhydric alcohol which is only partially esterified with an oil acid.

INSULATED WIRE. G. S. Lobdell (to General Cable Corp.) U. S. 2,079,943-4, May 11. Coating rubber-insulated wire with a thin layer of nonporous plastic made by reaction of polysulfides with olefin derivatives.

LOW VISCOSITY CELLULOSE ESTERS. C. J. Malm and H. S. Gardner, Jr. (to Eastman Kodak Co.). U. S. 2,080,054, May 11. Viscosity reduction in cellulose ester solutions by adding just sufficient water to hydrolyze the unused acid anhydride, and heating the mixture at 110-170° C. until the desired viscosity is reached.

MOLDING COMPOSITION. G. C. Howard and L. T. Sandborn; W. H. Mason, R. M. Boehm and W. E. Koonce (to Masonite Corp.). U. S. 2,080,077-8, May 11. Making very dense, dark colored or black molding plastics with a vitreous appearance by steaming wood under pressure and releasing the pressure suddenly to explode the wood fibers, and using the fines from this operation as a plasticizer (with water) for molding the coarse fiber.

SYNTHETIC RESIN. E. G. Peterson (to Hercules Powder Co.). U. S. 2,080,436, May 18. A condensation product made from a terpene (having no conjugated system of double bonds), maleic anhydride and a rosin derivative is esterified with an alcohol to make a resinous product.

SYNTHETIC RUBBER DISFERSIONS. W. H. Carothers (to E. I. du Pont de Nemours & Co.); B. Dales and F. B. Downing (to E. I. du Pont de Nemours & Co.). U. S. 2,080,558 and 2,080,561, May 18. Liquid dispersions of halogen butadiene polymers, e. g., chloro-2-butadiene 1,3, with an organic liquid as the continuous phase are made by dispersing the chlorobutadiene (partially polymerized or not) in glycerol, ethyleneglycol or formamide and then effecting (or completing) the polymerization.

POLYVINYL CHLORIDE. G. Wick (to I. G. Farbenindustrie A. G.). U. S. 2,080,589, May 18. Separating after-chlorinated polyvinyl chloride from its solutions in tetrachloroethane by evaporating to about 10% polymer content, then chilling to about —20° to —30° C. and adding cold methanol to the resulting gel.

NITROCELLULOSE. M. O. Schur (to Brown Co.). U. S. 2,080,934, May 18. Nitrocellulose is made from sheets of unbeaten wood pulp by treating with hydrochloric acid gas and water vapor, then nitrating.

DISPLAY MANIKIN. Cora L. Scovil and Lillian L. Greneker. U. S. 2,081,071, May 18. An ornamental display manikin is made of a hollow foundation layer of a transparent plastic cellulose derivative, molded to the desired shape, and a protective covering of overlapping patches of a transparent preformed film material.

THREE SECONDS AND IT'S OUT!

(*Continued from page 19*) paint and lacquer and suspended over a drain board.

What has all this to do with plastics, you ask? The answer is that plastics play an important role in the efficient, dependable operation of this fire detecting and fire extinguishing equipment. Research revealed that molded phenolic was especially suitable for the discharge horn on the smallest of the extinguishers. This horn is made

of a special improved impact-resistant material which will withstand the abuse and shock to which these extinguishers are subjected when in use. More than that, the material is a non-conductor of electricity and this is an important factor, particularly when fighting electrical fires. When carbon-dioxide snow is released, the temperature drops to 110 deg. F and this has no appreciable effect upon the molded discharge horn. It also is a slow conductor of heat or cold and this aids in preventing the operator's hands from being "frost-bitten."

On the larger units the discharge horns, which are as long as 32 inches, are made of laminated phenolic with a fabric base. Here again the same factors, which make molded plastics desirable for the small unit, prevail. Being fabricated with a canvas base, the laminated discharge horns are exceptionally resistant to shock. Many ships at sea are protected with fire detecting equipment, audio smoke detectors and the Lux fire extinguishing system. In all these, molded plastics are proving their dependability for housing and other integral parts of the equipment.

Basically, the best way to fight fires is to prevent them. The second fundamental of fire fighting is to provide devices which will quickly detect fires, and equipment which will extinguish them. Fire fighting apparatus must be dependable and this reliability can only be assured by the selection of proper materials used in their construction. Plastics have definitely proved their dependability in this respect for fire detecting and extinguishing equipment. Bakelite is the molding and laminating material used by Walter Kidde & Company.

MEASURING THE PLASTICITY OF HOT MOLDING COMPOUNDS

(Continued from page 41)

TABLE XI

Temp. °C.	Setting time Sec.
180	34
170	39
160	51
150	67
140	97
130	176
120	450 (est.)

An illustration of the importance of the preheat test in helping to interpret the ordinary type of flow test may be of interest. Fig. 21 shows that samples U and V have practically identical flow distance, not alone at a single pressure but at all pressures within the range where distance tests may be made. Fig. 22, however, shows that these two materials have widely diverse rate-of-setting characteristics.

The same type of discrepancy may occur in reverse manner. As an example, take the complete preheat curves for samples W and X shown in Fig. 23, which duplicate each other in shape and position almost as

closely as the testing accuracy of the machine will permit. Surely these two samples must be alike, yet reference to Fig. 24, where the distance-pressure curves for these same two samples are shown, discloses a startling difference. Thus, on account of the multiple properties which are present in molding compounds, of which the softness and the rate of setting are notable examples, it is possible to make, if only single tests are considered, a serious error in finding that two given materials are alike.

From the above data it may be considered established that two compounds cannot be shown to be alike until the characteristic curves for both softness and setting rate have been found to be identical.

NEW PLASTICS OF AERONAUTICAL INTEREST

(*Continued from page 42*)

Aerolite spinning pots

Spinning pots for the rayon industry have some aeronautical interest since the conditions of work are similar to those of supercharger rotors. We are engaged in the improvement of these pots by reinforcement.

Aerolite bearings for steel rolling mills

Aerolite material has a lower coefficient of friction under high pressures and at low velocities than metals. In addition it has remarkable shock absorbing characteristics. These qualities make it particularly suitable as a bearing material in steel rolling mills. No lubricant is used though a stream of water is directed on to the bearing to keep it cool.

Many fittings in aircraft are subjected to rather similar conditions of slow movement, often reciprocating in character and sometimes of considerable pressure, where lubricant cannot easily be provided, and it might be advantageous to use Aerolite instead of brass. Very simple bearings can be made by making a hole in a sheet of Aerolite which can readily be bolted to the main aircraft structure.

Aerolite interleaving for motor car springs

Another application where the self-lubricating and great wear resisting properties of Aerolite material may be used is for interleaving motor car springs.

DESIGNING HEATING CONTROLS

(*Continued from page 27*) and would permit our designer, Ted Hess, a free hand for decorative effects.

Three of the units on which Mr. Hess used molded covers are shown here, and they include strap-on Hot Water Controls, Fan Controls and Pressure Controls. He has combined smoothly rounded contours and sharp edges—both possible only in plastics—and has worked in smart ribbed effects and setbacks. Proof that both his designs and choice of materials were right can be seen in the almost universal comment by purchasers of control equipment. Invariably smart appearance is mentioned.

(*Continued on page*)

Naturally we feel that this is a distinct sales advantage, for while we have many exclusive mechanical points, they can be quickly forgotten if a product is old-fashioned in design or just unpleasant to behold. Good product appearance starts a salesman off on the right foot by putting a prospect in a receptive frame of mind. Then too, these plastic cases give us several production advantages, in assembly of the transparent windows and metal nameplates, and in elimination of all buffing, spraying and baking operations. We can mold in the attachment inserts, which we couldn't do with stamped metal, and thus attach covers with one or two screws. The biggest advantage in the molded cases is probably the chip-proof, wear-proof luster of the material, which we can guarantee against crazing, checking, chipping, peeling, rusting or corroding from contact with moisture, steam or refrigeration gases. They are molded of Durez by Eclipse Molded Products Company.

PRINTING ON PLASTICS

(*Continued from page 34*) a carefully regulated temperature which results in the printing becoming an integral part of the container, resisting the action of moderate solvents and also the wear and tear which often defaces paper labels. An important feature of this treatment of plastics is that the oven heat is so controlled that no shrinking, distortion or discoloration of the plastic material takes place.

Because of their superior beauty in form, color and finish plastic containers are making rapid inroads in practically all fields where progressive manufacturers realize the importance of the increased sales appeal in the improved and modernized makeup of their product containers. And in such connection this method of container decoration offers more than a new method of duplicating in permanent form the appearance of existing product labels. The process possesses a genuine beauty of its own, which, when utilized in new and artistic creations, free from the limitations of paper label designs, offers an added element in packaging not heretofore possible of achievement.

As will be seen in the illustration on page 34, containers may be printed with an all-over pattern or a single word, and closures are similarly treated with very satisfactory results. Thus with the development of the new fields for plastics there has been simultaneously developed a new method for their decoration, and because of the automatic methods employed, it is economical as well.

MOLD COST NO LONGER A BARRIER

(*Continued from page 25*) terials have been developed with translucent qualities comparable to opal glass, yet weigh about half as much. Holes and threaded attachment parts can be molded integral with the piece. The item of weight alone should influence manufacturers to consider ureas in whatever lighting equipment they plan to produce at any time.

The safety incidental to a molded plastic shade the size of the one illustrated cannot be ignored. If it should fall, and they sometimes do, and strike a person on the head, little harm could result. The material cannot shatter like glass, nor are its edges particularly sharp when it breaks. Then, of course, there are the savings which accrue from less rigid and weighty packing and shipping requirements, and in delivery charges in the retail store. These will be evident long after mold costs have been absorbed and forgotten.

Let us turn again for a moment to the Teleprinter housing. It was produced from an expensive mold and hardly more than a thousand units were made. But in no other material could the housing be made in one piece which was desired by the engineers responsible for its design. Nor would any other material effect the economies of assembling and finishing made possible with plastics. It was these points, coupled with the fact that a permanent finish which would neither rust, corrode, nor dent must be obtained if the Teleprinter was to maintain its prestige of leadership in the communications field, that convinced these engineers that the mold cost was unimportant.

All these advantages should be considered from the merchandising angle as well as from a manufacturing point of view, and they pretty well apply to small moldings as well as large whether in the shape of radios, housings, lighting or industrial equipment. If it is once determined that plastics are suitable materials for the manufacturing problem you have under consideration, then mold costs should be no barrier.

PLASTICS FOR AUTOMOTIVE HARDWARE

(*Continued from page 44*) moved, trimmed and shipped. Neither plating nor polishing is required. The solid molding takes its luster from the polished surface of the mold. Both phenolic and urea-formaldehyde types possess this same property. But better than that, the same mold may be used for both.

The plastic engineers claim other advantages for their products. They point out that it weighs about one-fifth as much as white metal and that breakage, due to the flexibility of the substance, is virtually zero. A solid piece, it can be drilled, carved or repolished, while it neither tarnishes nor corrodes.

Of course, plastics are no strangers to the automobile industry. Instrument panels, knobs, steering wheels and an occasional dome-light lens are numbered among interior hardware items made of these substances for several years. Much older is their use in the manufacture of distributors and other ignition parts. Recently, Ford's experiments in the plastic field have attracted world-wide attention and aroused much interest.

Cause for speculation

How closely these newly-developed substances may tie in with automobile industry of the future offers a fertile field for speculation—but not prediction. Both industries are robust infants and both are entering a year

which promises their greatest production. Automobile engineers are looking for something new; the plastic men are seeking new uses.

Certain it is that plastics serve in many uses better than either wood or metal. Lack of deterioration through corrosion or rot, light weight and many other factors may make these resins useful in other than small hardware items.

Right now the synthetic resin manufacturers are worried more about the means of increasing their production facilities than production itself, so great has demand become. Formerly confined to toilet articles and novelties, the resins now are beginning to supplant glass in light fixtures and find use as surfacing for wall board.

American supply ample

With proper plant facilities American plastic manufacturers can supply whatever demands new applications create. Hazardous reliance on German stocks of urea formerly necessary for manufacturing the urea-formaldehydes has been obviated since du Pont began quantity production of this ingredient. American urea buyers are safe should war cut off the European supply. Likewise, there seems to be no limit to the production possibilities.

NEW USES FOR TRANSPARENT PLASTICS

(*Continued from page 44*) the necessity of drilling holes in the glass, for the screws. Otherwise, special frames are required to hold it in place. Some manufacturers employ molded glass covers for relay parts, with holes for attachment screws in the cover. They are comparatively expensive and raise the cost of the unit, and because breakage is frequent, the use of glass enclosures is not encouraged. These objections may be overcome through the use of transparent plastics which, for all practical purposes, are unbreakable and may be drilled easily for attachment with machine screws.

Molded covers of synthetic resins are less costly and easier to mold than glass covers. This is particularly true of acrylic resins. It has not been easy to develop the proper molding technique for the transparent acrylic resins but successful results have been achieved. For example, the illustration shows a transparent molded cover of acrylic resin for the bell-box of a telephone. One naturally objects to the unwarranted display of the unsightly "inner works," although it is a distinct boon to the maintenance man. For equipment subject to the discriminating public gaze, a simple black opaque cover is adequate. However, the illustration emphasizes the inspection possibilities when covering equipments and relays with transparent plastic materials.

Oscillographs

Transparent plastics are used for inspection purposes on other equipment than relay parts. Reference is made in particular to neon lamp oscillographs, which are used for visual inspection of recurrent electrical phenomena. Wave forms are portrayed upon a transparent plastic sheet, which is used as a viewing screen for the optical

image. A ruled graph covers the surface of the screen, and permits estimates to be made on the amplitude and frequency of the waveform. At least one manufacturer of oscillographs has selected transparent sheets of cellulose acetate in lieu of ordinary plate glass. Three sound reasons prompted the choice:

a. The instrument is of a robust design, and easily broken parts such as glass plates, are precluded.

b. The cost of assembly is lessened as the transparent plastic is easily attached to the front panel with machine screws.

c. The lines of the graph are permanently imbedded in the plastic, not by a surface scratching process (as would be necessary for glass), but by the addition of an organic solvent in the black ink. The solvent softens the cellulose acetate, and leaves the ink imbedded in the surface, upon evaporation.

Slide rules

It is surprising to observe that so common an article as a slide rule has been neglected in the application of transparent plastics. A number of slide rules have one or two small reading glasses which move parallel to, and which cover the numerical scales. These glasses facilitate readings on the numerical scales by a fine black line, which runs perpendicular to the numerals. These glasses are held to a sliding frame by four machine screws, which pass through the carefully drilled glass. As a result, the sale price for a pair of small reading glasses, two and one-half square inches in area, each, is around 35 cents. An examination by a casual observer will convince one that the reading glasses in the great majority of slide rules are cracked. The screws have either been tightened too tightly, or else rough handling has caused the damage. A solution to this difficulty, which lessens the efficiency of slide rule computations, lies in the "unbreakable" transparent plastics. Replacement of reading glasses by the plastic material is a logical step. The writer has been using slide rule reading glasses of transparent acrylic resin for over a year with undiminished effectiveness in the material.

Molded optical lenses

The clear white transparency of acrylic resins are utilized to best advantage in various lenses for optical systems. Some British manufacturers have recently advertised a complete line of molded lenses of acrylic resins. Spectacles, binocular lenses and prisms, microscope lenses, camera lenses, etc., are included among them. It is claimed that the lenses may be molded directly to final form, precluding the long polishing operation required of glass lenses. The elimination of the polishing operation represents a large saving in labor and expense. This may be attributed to the fact that acrylic resins are very easy to mold to form, as compared with glass, and in addition, there is less likelihood of internal strains appearing in the resin to distort the vision. The molds are highly polished and accurately machined to the desired dimensions. As optical systems require the utmost accuracy in the radius of curvature of the lenses, careful de-

signing is necessary, with due cognizance of mold shrinkage. It is doubtful that molded plastic lenses will be suitable for high precision instruments where carefully and accurately polished lenses are the cruces of the precision. However, there is every reason to believe that molded plastics lenses will not only be adequate for moderate precision instruments, but will effect a substantial reduction in cost.

And—milk bottles

Strangely enough, transparent plastics are being used on milk bottles. There is a tendency among independent dealers in the midwest to insure complete sanitation for the contents of milk bottles by covering the mouth of the bottle and the milk cap with a piece of transparent plastic—four inches square. Not only are domestic animals discouraged from licking the caps of the milk bottle, but dust and germs are excluded from the mouth of the bottle when it is left out of doors. The small, flexible, and very thin transparent plastic foil is applied over the bottle top and held to the neck by a rubber band slipped over the head. Transparency of the material is desired, as it permits reading the milk cap label. However, the plastic is sometimes tinted with a trace of coloring matter.

The applications of transparent plastics are increasing to a large extent. Whereas, in the past, their value was expressed in terms of decorative appeal, recent applications indicate an interest in their practical value. It is hoped that the above examples will suggest to the reader new markets for these materials.

THIS PLASTIC AGE OF COLOR

(*Continued from page 21*) to a larger market. There is every indication that radical departure in automobile exterior hardware will be evident in certain 1938 production automobiles. Door handles will be made of colored plastics in variations to harmonize or contrast with the exterior Duco colors. This use would be not only novel and colorful but would contribute much to exterior appearance and would provide for a "style" and "simplicity" not to be obtained with other materials.

Industry has always made synthetic materials. The introduction of "Pyralin" (a cellulose nitrate material) in 1883; made timely color combinations in fountain pens possible. Through its use pens acquired new style and smartness. The effective obsolescence factor that color change permits has helped to increase fountain pen sales more than fifty percent in recent years. At one time fountain pens were nearly all black—today, black represents a small percentage of volume. Analysis shows a certain green is much in favor at the moment.

Cellulose nitrate plastic provides an ideal medium for endowing home interiors with the necessary accent of bright, cheery color. Toiletware sets of solid hue show off the rich natural beauty of this plastic. In the opinion of many representative buyers today, plastic materials are decidedly effective looking in solid colors. New horizons of sales leadership for toiletware sets have been

achieved by simplicity of outline and a gay interpretation of coral in plastics. This type of plastic affords a practical medium for reproducing worthwhile color effects. It has made new beauty possible in shoe heels, umbrella handles, radio dials, slide fasteners and costume jewelry. Today a limitless range of adaptations is encompassed in various plastic formulations.

Unusually soft and attractive pastel color effects are possible in acetates and have helped to develop greater interest in plastic lampshades. Plastics have enabled the lampshade industry to tie-in profitably with the vogue for metallic colors so popular in modern interiors. A metal lampshade can have none of the charm of a satisfying transparent but subtly iridescent plastic simulation of copper, silver or gold. Texture effects in varied and interesting weaves are now available in cellulose acetate sheets suitable for lampshades. Thus the plastic lampshade acquired the advantages of fabric without the disadvantage of being hard to clean. Home owners want rust, silver-green, champagne beige, brown and pink, in addition to metallic colors for Fall shades.

Aside from aspect of beauty, color in plastics imparts helpful emphasis and utility. Plastic parts can be made interchangeable. The ornaments of a lampshade, the dial knobs of a radio, the moulding of a refrigerator or washing machine, the handles on a kitchen range or drawer, can be made variable as to color. A proper range of accent color variations provided upon inexpensive detachable plastic strips or parts is the only requirement. This arrangement makes possible a note of smart distinction which at the same time serves to contribute to the appearance of unity in a living room or a kitchen, as the case may be. By this means, the color of the kitchen can be echoed by the various kitchen units, and purchases given a wider field of choice. Blue plastic strips, for example, inserted in especially devised moulding frames can help to "bring out" the blue of curtains, linoleum, utility handles, knobs and clocks. This color relationship plan tempts the buyer to favor one manufacturer with her entire kitchen appliance order.

Speaking of the kitchen, let me stress the fact that stirring colors—strong, bright reds, oranges, greens and blues are permissible because activity in the kitchen is consistent with occupation. Strong colors serve to stimulate and are more to be desired under such conditions than satiating browns or meaningless greys. Color can help to lift the kitchen out of the realm of the commonplace. Housewives are quick to appreciate colorful, harmonious interiors.

Designs with interchangeable color parts can also serve to reduce inventories. The right range of color accents may prove to be the entering wedge to wider markets.

With industrial chemists turning out new materials in synthetic products, particularly plastics, there is every reason for manufacturers in all industry to seize upon the opportunities bound to follow the use of these amazing products and build them into their own production. Let manufacturers discard their out-moded materials and turn to plastics. For it is plastics that afford this Age of Color the most complete medium for its expression.

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